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A Basic Food Industry.

SOME IMPORTANT facts concerning the Meat Trade are presented in this issue, and had we the space it would be interesting to trace the growth of the industry from the primitive hunter "Homo," with his stone implements, his consumption of raw flesh, and crude methods of hide tanning, to the modern packing house, complete with its staff of scientists, turning out endless varieties of foodstuffs and by-products.

"Health" Societies.

The numerous ramifications of the Meat Trade and the number of trades dependent on this great basic industry are amazing.

In spite of never-ending propaganda by vegetarian societies, doctors, and so-called "dietetic experts," we hardly realise even yet how dependent we are on the Meat Trade, and in this connection it is interesting to note the recent experiments carried out by Dr. C. W. Lieb, and reported in the *Journal of the American Medical Association* for July, 1929. The experiments in question were carried out on two Arctic explorers, Stefanson and Andersen, who lived for some considerable time on a purely carnivorous diet and with very beneficial results. These experiments are worthy of study by all interested in dietetics.

Reorganisation.

Meat traders have been engaged, since the war, in setting their house in order. The marking of foreign meat has been beneficial, and the latest proposal for grading British home-killed beef into three grades, as announced by the Ministry of Agriculture, should prove a good thing for both farmers and butchers. The frozen and chilled meat trade, especially the South American branch, is already highly organised as regards the purchasing of raw material and marketing of the finished article, and the "home-killed" trade would do well to do something in emulating their foreign rivals in this respect.

Trade Classes.

There is one particular side to the trade on which we would like to congratulate all concerned—namely, the educational. Some three or four years ago a scheme of technical education for young traders was drawn up somewhat on the lines of the excellent schemes in vogue with grocers, etc., and classes are being held throughout the country at various centres, at which young butchers are taught something of the importance of their trade. It was a wise step on the part of the *Meat Traders Federation* to inaugurate these classes, and they can only result in raising the prestige of the meat trader himself as well as proving of value to the trade in general.

The Research Worker.

A striking feature of recent years is the enormous growth in meat by-products and "side lines," such as canned goods, meat pastes, and medicinal preparations. The manufacture of these products offers a wide scope for the research worker, and already several firms have realised the value of a trained scientist on the staff. We think that more use might be made of men possessed of a sound training in scientific subjects than is the case. Important problems await elucidation, such as the question of refrigeration as applied to Empire meat marketing schemes. Australian and New Zealand shippers are handicapped in sending their beef to this country in only being able to send it in the frozen state, whereas South America ships enormous quantities of chilled beef. This problem has other aspects than that of refrigeration; we mention this as an example.

Humane Slaughtering.

Much discussion has in recent years centred on the use of electricity for the so-called humane slaughtering of animals, notably in Germany. A German invention for electrocuting animals has been on the market there for some years, the claims made for it by the inventors giving one the impression that

it is absolutely "fool-proof" and the last word in instruments for the humane killing of animals. This invention has been tried out in this country, and a report on it recently appeared in the *Veterinary Record* (May 18, 1929).

The inventors, Professor Muller and Herr Weinberger, an engineer of Munich, personally demonstrated with the instruments at the Model Bacon Factory of Messrs. Harris, Ltd., Calne, Wiltshire. The demonstration was witnessed by a number of interested people, including the well-known veterinarians, Ducksbury and Anthony, who afterwards examined the electrocuted carcases in detail, and issued a report, from which it appears that the method is still far from perfect. Carcases were badly "splashed," hæmorrhages being present in the tissues throughout. "Splashing" is the bacon curer's bugbear, blood being a favourite medium for growth of bacteria, so that the better a carcase is bled the better its keeping qualities will be. Tests were carried out by spectroscopic methods to determine the presence of blood in the tissues, the results obtained being such that the authors of the report pronounced against the electric method. Apart from this question of "splashing" of the tissues, fractured bones and burnt areas were discovered in certain parts of the carcases where the electrodes had been placed. Ducksbury and Anthony conclude their report by stating that they cannot recommend the method in its present state of development.

Beef Eaters.

In England and European countries, generally, the number of cattle per 1,000 of human population is very small compared with that in the large cattle-producing countries. This means that these countries have a much smaller *per capita* beef consumption, their meat supply being made up more largely of pork. Also that they must import large quantities of their beef.

When the human population is large per square mile, the cattle population must necessarily be small. In Great Britain, for example, the cattle population per 1,000 people in the period 1920-1925 was only 253; in Germany, 280; in France, 346; in Russia, 335; and in all other European countries, 113.

In New Zealand, on the other hand, the number of cattle per 1,000 persons in the same period was 2,643; in Australia, 2,536; in Argentine, 4,260; in Canada, 1,093; and in the United States, 619.

Nations are beef eating so long as beef can be obtained at fairly reasonable prices, and this should be entirely possible with a cattle number of say 600 per 1,000 of the population.

The most energetic people on earth, notorious beef eaters, are thus seen to have an adequate domestic supply of cattle.

The Pectin Controversy.

The chemistry of pectin continues to hold an important position both in current research and in food policy. At the recent annual meeting of the German Chemical Society at Breslau, Prof. Ehrlich summarised his extensive investigations in the chemistry of the pectic bodies, and papers are constantly appearing in scientific journals at home and abroad.

An important monograph by Dr. Branfoot (reviewed on another page) has just been issued under the authority of the Department of Scientific and Industrial Research. The report states that certain fruits are naturally deficient in both pectose and pectin, necessitating for jam-making "the extraction and preparation of tasteless and colourless pectin from fruits, chiefly apples." This pectin is used to supplement fruits required for jam manufacture.

The Rôle of Pectin.

We are fortunate in having an article by the well-known chemist, Dr. Sucha Ripa, in this issue. He deals, not so much with the physico-chemical problems involved in the rôle of pectin in jams, as with the policy of adding pectin at all. His views will meet with wide support—and criticism. Dr. Branfoot's comments in this connection become of special interest. She writes:

"Under the circumstances such a procedure is entirely legitimate, the added fruit extract being quite innocuous, and if carefully used, in no way detrimental to the flavour or quality of the resulting jam or jelly. Apart from other considerations, a firm jelly is essential to the manufacturer for purposes of transport, whereas in the home this factor need not be considered.

Uninformed Antipathy.

"In America, the addition of pectin for better production of jams and jellies has been adopted alike by housewives and manufacturers. Pamphlets are obtainable giving detailed instructions for the small scale production of pectin from various fruits —apples, lemons, or oranges—with the object of preparing tasteless and colourless pectin extracts. More recently, it has become possible to purchase similar pectin extracts for the use of the householder or the manufacturer.

"Hence, although the procedure is open to abuse, there are no grounds for the marked antipathy which prevails in this country, among the uninformed, against such so-called 'adulteration' of jams or jellies, which is not unfrequently described as adulteration with undesirable chemicals."

The Delaware Researches.

Another valuable report on the subject of pectin, which has recently been published by the Delaware Agricultural Experiment Station, justifies considerable attention because of the amount of new technical data which it contains. The abstract which follows should be of great interest to many of our readers who are interested in the manufacture of pectin or jelly and various phases of pectin extraction and production.

The subject of this new bulletin is "Fruit Jellies, VI., The Rôle of Pectin and the Extraction of Pectin from Pectin Materials," by Philip B. Myers and George L. Baker, Del. Agr., Expt. Sta., *Bull.* 160, 64 pp. This is the second report on pectin, the first being "The Viscosity and Jellying Properties of Pectin Solution," in which jelly strength of jellies was found to depend largely upon the viscosity of the pectin solution.

Jelly Grade.

Using pure lemon albedo (white peel) as the source of pectin the following conclusions were reached:

The jelly grade of a pectin reaches an optimum value when the pectin is extracted at a hydrogen-ion concentration 2·40. This optimum point is independent of the titratable acidity of the extracting medium and of the nature of the acid used. Extractions at hydrogen-ion concentrations greater than that represented by a pH of 2·40 results in a sharp decline in the jellying power of the pectin, indicating a hydrolytic action on the pectin.

The jelly grade of a pectin decreases as the time of boiling during extraction increases. Boiling from 5-15 minutes results in a sharp decline in jelly grade; boiling from 15-30 minutes has scarcely any effect upon the jelly grade of the resulting pectin; boiling from 30-60 minutes sharply decreases the jelly grade; and boiling from 60-180 minutes the decrease in jelly grade is more gradual and is a straight line function of the time of boiling.

Jellying Power.

The data presented indicate that the methoxyl content of the pectins is not a criterion of their jellying power, and that there is no correlation between the yield of pectic acid obtainable from a pectin and its jellying power, since the alkali also saponifies some of the hydrolytic products of pectin, low in jellying power, which are converted into pectin acid upon acidification.

The viscosity method of determining the jellying power of a pectin has its limitations. It does not have a general application, but may be used to determine the jelly grade of pectins prepared by the same method of extraction.

The yield of pectin depends upon the hydrogen-ion concentration at which the pectin is extracted rather than upon the titratable acidity. Increasing the hydrogen-ion concentration beyond a pH of 4·0 results in a sharp decrease in the yield of pectin, indicating that the pectin is hydrolised and that some of the hydrolytic products are insoluble.

The yield of pectin also depends upon the time of boiling during extraction. Boiling from 5-60 minutes the yield increases rapidly; boiling from 60-120 minutes the increase is not so pronounced; while boiling longer than 120 minutes results in practically no increase in yield above that obtained by boiling 120 minutes.

pH Control.

Regardless of the amount and nature of the acid used, a pectin of maximum jelly units is obtained when it is extracted at a hydrogen-ion concentration of pH 2·15. When the hydrogen-ion concentration is greater or less than that represented by a pH of 2·15 there is a sharp decline in jelly units.

A pectin of maximum jelly units is obtained when the extraction is accomplished by boiling 30 minutes. A boiling period shorter or longer than 30 minutes results in a decrease in jelly units.

The greatest possible quantity of jelly, therefore, is obtained when the pectin is extracted from the pectic material at a hydrogen-ion concentration of pH 2·15 by boiling 30 minutes.

World Wheat Situation.

World wheat prices declined in April and May, but rose rather steeply in June and July as the new-crop outlook in North America, especially Canada, turned unfavourable. According to a study published in September by the Food Research Institute of Stanford University, the movement of wheat in international trade was restricted in April-July; net exports for the crop *year* 1928-29 nevertheless reaching a record figure—about 935 million bushels. Very heavy stocks of wheat in exporting countries continued to the end of the crop year 1928-29, which closed with by far the largest carry-over of post-war years. Stocks were also large in European importing countries.

The new crop year thus opens with huge accumulations of stock. On the other hand, the Northern Hemisphere crop (apart from Russia, China, and Asia Minor) is the smallest in recent years. Canada has a notably short crop and the United States a rather small one; but Europe may harvest one of the largest crops since the war.

The outlook for trade and prices is not clear. In so far as the international statistical position may be held to dominate prices, the level of international cash wheat prices in the next six months seems likely to range well above the levels of 1923-24 and

1928-29, but below the levels of 1924-25 and 1925-26 unless severe crop damage occurs in the Southern Hemisphere, upon which also depends in a large measure a possible change in existing international price relationships. These are remarkable at the moment for unusually high prices of wheat futures in Winnipeg and Chicago as compared with Liverpool and Buenos Aires.

Between September and January, 1924-25, world wheat prices advanced over two shillings a bushel. The differences now apparent between the opening weeks of the crop years 1924-25 and 1929-30 are quite as striking as the resemblances, though it is usually the resemblances that receive most emphasis in the trade Press.

An Empire Christmas.

The Grocers' Exhibition at the Agricultural Hall in the last weeks of September, like its predecessor the Bakers' and Confectioners', was another gathering under one roof of all the most go-ahead people in the trade.

The Empire Marketing Board was particularly well represented, and judging by its newest literature, it will not be the fault of this indefatigable body if we are not to have an "Empire Christmas."

The following recipe is suggested for a simple and economical Empire mincemeat:

2 lbs. apples (*United Kingdom or Canada*), 1 lb. grapes (*United Kingdom*), 1 lb. raisins (*South Africa*), 1 lb. currants (*Australia*), ½ lb. demerara sugar (*British West Indies or British Guiana*), ½ lb. chopped orange peel (*South Africa*), rind and juice of 1 lemon and 1 orange (*Palestine or British West Indies*), 2 ozs. mixed spice (*India, British West Indies and Zanzibar*), pinch of salt (*United Kingdom*). When all ingredients are well chopped and mixed, put into jars and tie down at once.

Canning goes Ahead.

The pea-packing season is now well past, and its success may be gathered from the fact that one firm, the Wisbech Produce Canners, Ltd., has disposed of about 4,000,000 cans. This, however, represents only about 40 per cent. of the number that could have been disposed of by this firm had supply equalled demand.

This year's plum pack promises to be a large one, helped to some extent by the partial failure of the Californian peach and apricot crops, a half of which were ruined by frosts.

The strawberry pack, of which all stocks have been practically disposed, was also satisfactory.

Two films have been made by the Gaumont Co. dealing with the canning of peas and raspberries. Whether these will be as diverting as "Caligari" or "Potemkin" is a question we prefer not to debate until we have seen these firstfruits of the National Canning Councils screen campaign.

F.I.B. Activities.

The Food Investigation Board published its Report for 1927 in November, 1928, following this up in June, 1929, with an *Index to the Literature of Food Investigation.*

This is a classified list of the titles of papers which have appeared in the technical trade Press in various countries during the last few years. Occasional pamphlets and bulletins are also included.

Those readers who find our monthly list of Current Food Literature of value will appreciate the practical use of this classified index.

Flexible-Mindedness.

All Quiet on the Western Front has been banned in Chicago. This is not, as has been suggested, because the civic authorities are over-sensitive about the moral tone of the city, but rather that Chicago cannot bear the thought of anything quiet.

At the next Canners' Convention (the crowning event of the Chicago Season), thousands of "loud speakers" are to be installed in the lobbies of the Stevens Hotel so that the proceedings of the various sessions may be heard by delegates unable to get admission. We agree with an American contemporary that this move of the N.C.A. is another proof of its "flexible-mindedness."

Avoirdupois.

The recent case of finding iron filings in tea, when 90 lbs. were found to be affected and ordered to be destroyed, though only after an incredulous magistrate had seen a magnet passed through the mixture, reminds us of a similar case which happened as long ago as 1860 in Bohemia, now known as Czechoslovakia.

A Mr. Fürmkranz, at that time, being a flour dealer, mixed cement with his wares, as a result of which several people, including some soldiers, died. Consequently Fürmkranz was sentenced to the gallows, or whatever they do sentence them to in that part of Europe; but, by some old feudal law, he was able to ransom his life from the State by paying over a certain sum, with the only condition that he should wear, till his death, the black sash demanded by this law to denote that he was an unhanged murderer.

Food adulterators of our own day are better treated—they are not even required to wear a black band.

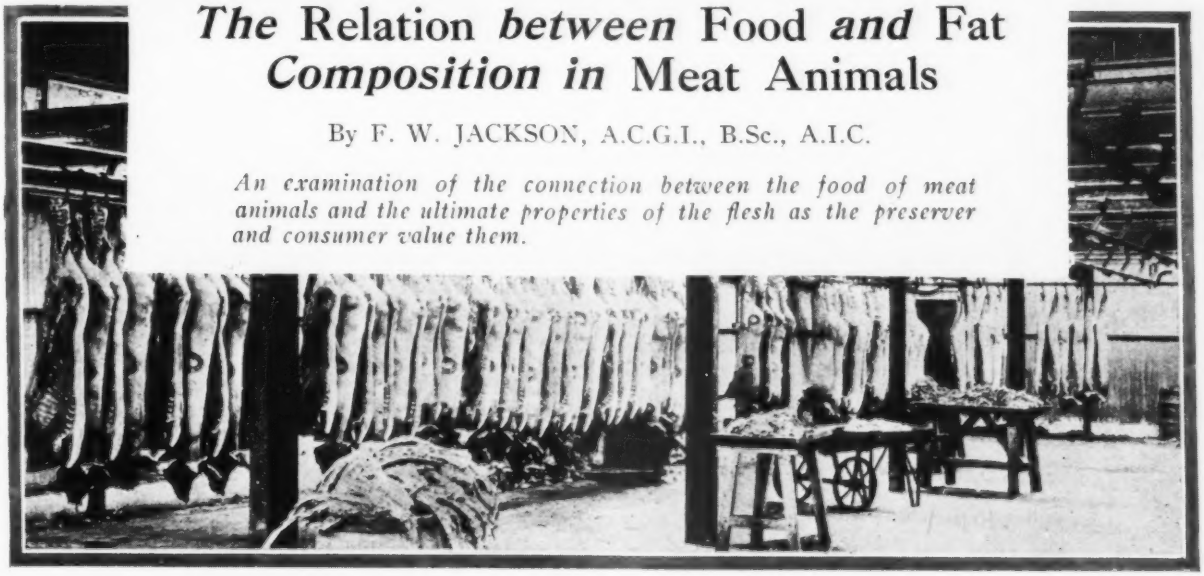
Lecithin.

In view of several articles we have published on the lecithin content of dairy products, it is interesting to note that O. W. Chapman, in the *Journal of Dairy Science* (1928, 11, 429-435), gives average lecithin contents as follows: Milk, 0·0447, cream 0·1981, skim milk 0·0165, butter milk 0·1302 per cent. The fat found in butter milk contains 13 per cent. of lecithin.

The Relation *between* Food *and* Fat *Composition in* Meat Animals

By F. W. JACKSON, A.C.G.I., B.Sc., A.I.C.

An examination of the connection between the food of meat animals and the ultimate properties of the flesh as the preserver and consumer value them.



GENERALLY SPEAKING, the consumer has little interest for the origin of the meat he buys, except perhaps in noticing that butchers attempt to add to the attractiveness of their wares by the use of such labels as "home-fed," "farm-fed," "dairy-fed," and the like. Unfortunately, these labels are too often used indiscriminately, though the thinking public probably attributes their exact value to them.

The edible portions of meat animals are composed, in the chemical sense, of protein and fat, more or less intimately blended. There are several important distinctions to be drawn between the two types of animal tissue. The protein-structures in meat can be regarded, almost entirely, as being an integral part of the animal organism. Some are muscles, and some more specific organs, such as glands, heart, lungs, and liver.

Lean Tissues.

The important point, however, is that it appears to be impossible to alter their chemical composition. Provided that the animal is healthy (essential when destined for human consumption) and in an active state of growth, the composition of the food eaten by the animal would not appear to have any effect whatever on the composition of the protein tissues (see for example, Zisterer). It is known that all protein tissues in the body are formed from the food-proteins, through analysis to amino-acids, and subsequent synthesis. Where the food is lacking or over-abundant in certain essential amino-acids, the animal may attempt to make good the inequalities by itself synthesising the missing constituents.

The main point is that there is no halfway line in this process. Either a perfect molecule of muscle protein is built up, or it is not. An imperfect molecule of protein, or one which does not match its fellows, would be useless and is therefore not needed.

There must, of course, be some relation between composition of protein and flavour, and since protein tissues are normally unvarying in composition, they must also be uniform in flavour. Included, however, in muscle, are the cell-contents, solutions of various salts and extractives in water. These also would appear to be constant in composition under all ordinary circumstances.

Thus methods of feeding would appear not to be responsible for the differences in flavour between the various cuts of meat from a given animal, or between one species of animal and another, or between a baby-beeve and an aged cow.

Fat Tissues.

Fat tissues are in a different category. Whilst fat at present exists in small quantities in every tissue and organ of the body, the largest amounts are found as an insulating layer beneath the skin, and in the deposits around the kidney. These may be regarded strictly as storage or reserve, because in a growing animal they are constantly being added to, without any concurrent withdrawal; in a starving animal, however, the fat reserves are very quickly mobilised, as soon as the more soluble sugars and glycogen have been consumed.

Possibly owing to the prodigious state of fatness in which animals were often kept in former times, the query as to where this fat came from appears frequently to have exercised men's minds, and the answer which substantially holds true to-day was supplied nearly a hundred years ago by Lawes and Gilbert.

By means of slaughter tests with pigs, and an analysis of the carcase, they were able to show that the body-fat altogether outweighed the fat that had been consumed as food. Hence it could only have come from carbohydrate and protein. It is now recognised that, whilst the production of fat from food protein is possible, and may indeed take place, it is much more likely that starch and sugar are the raw materials.

The actual details of this synthesis do not concern us. The products are, presumably, the glycerides of

stearic, palmitic, and oleic acids, and intensive examination of animal fat suggests that the glycerides are largely "mixed" rather than "simple" ones.

Considerable variations in composition are, however, found in the fat from different parts of the same animal.

Variations in One Animal.

Kidney-fat, for example, is found to have a higher solidifying point and lower iodine value than that covering the back in pigs. A considerable number of interesting observations on this point has been made by Henriques and Hansen. They found a progressive gradation in iodine value in the various layers of fat under the skin of a pig, and attribute these differences to the differences in temperature of the regions where the fat is laid down.

According to this idea, one supposes that, as the reserve fat must be fluid in the live animal, the proportion of liquid olein to solid palmitin and stearin is adjusted very carefully to this end. Since the body temperature beneath the skin of a pig may be only 33·7° C., when the rectal temperature is 39·9° C., the subcutaneous fat should have a lower solidifying point than the kidney-fat; and this is indeed the case.

These authors also showed that the character of the back-fat could be varied experimentally by altering the external temperature in which the animal is kept, and by minimising the loss by radiation of heat from the body.

As already stated, these experiments have been carried out with pigs, the reasons being the ease with which they can synthesise fat from carbohydrate, and the comparative rapidity with which the results can consequently be obtained. It may be objected that, as the diet of pigs invariably contains oil or fat, it is not legitimate to argue that the whole of the fat in pigs so fed is synthetic, and this objection is perfectly valid, as the sequel will show. It thus becomes necessary to discuss the effect of the oil or fat in the feed upon the composition of the body-fat.

Practical experience at once indicates that, even in any one lot of pigs all fed alike, there may be considerable differences in the composition of the back-fat. This is evidenced not only by such determinations as those of iodine value, refractive index, or solidifying point, but also by the texture of the fat as determined by feel. From a large number of determinations carried out over a period of years the author has found the iodine value of the back-fat of pigs to vary between 54 and 87.

This evidence for the presence of diverse proportions of unsaturated fatty acids is supported by published analyses of lard which invariably state that small amounts of linoleic and linolenic acids are detectable.

More striking evidence is obtained from a study of cured bacon and hams. In such products, the curing process prevents putrefaction, but does not inhibit the development of rancidity. If a large assortment of matured hams (unsmoked) be inspected, one is at once struck by the variations of colour, odour, and texture in the fat.

One notices all gradations of colour from pure white to a deep golden brown, the texture of the white fat is firm, whilst the brown fat is very soft and oily and there are related variations in odour from "bland" to "definitely objectionable." As the manufacturing process treats all hams uniformly, one is forced to the conclusion that the cause of these variations lies in the pigs themselves. On inquiry, one finds that the pigs which gave soft, oily fat have been fed on materials comparatively rich in oil or fat, such as maize and some of its products, rice products, oil-seed residues, certain kinds of fish meal, meat meals, hotel refuse, and so on. It thus appears that the occurrence of variable fat-texture in pigs is a special case of the well-known physiological phenomenon that oils consumed by an animal may appear subsequently in its fat tissues in apparently an unaltered state. A number of striking examples of this phenomenon may be recorded.

Fat may come from Food.

In the case of cottonseed cake, it was found by Soltsien that, with pigs fed on this material, the lard responded to the Halphen test, whilst the butter from cows so fed also gave this test, thus indicating the presence of some constituent derived from the oil in the food. Other cases in which milk was concerned are recorded by Engel, by Bowes, and by Winternitz.

Caspari records that iodised fat, when added to the food, passed into the milk and also into the fat reserves. Considerable numbers of tests have also been carried out on dogs, goats, rabbits, and geese, all to the same end.

The author's observations on hams have likewise established the intimate relationship which appears to exist between the kind of oil in the food and the properties of the ham-fat. Thus in pigs, whose chief source of food-oil is obtained from a rice or peanut by-product, the resulting fat, when allowed full opportunity of becoming oxidised, remains practically white in colour on the surface, has a slight sticky feel, is soft and oily, and possesses a characteristic, though not very objectionable, rancid odour.

On the other hand, with pig-fat suspected to contain maize-oil, or linseed oil, or soya bean oil, the rancid fat is rich golden-yellow or brown; is not sticky, but may be very soft; and has an odour distinctly reminiscent of varnish. These differences appear to be what one would expect from the fact that, in technical language, rice and peanut oils are called "non-drying," whereas maize, soya bean and linseed oils are "drying"—that is to say, on oxidation they are partially converted into dark coloured polymerised materials resembling resins.

Effect of Non-Fatty Diet.

If the intensive use of oily feeding stuffs for pigs results in these unsatisfactory properties in the cured products, then the converse should also be true. It is thus interesting to note that a ration composed of barley meal, boiled potatoes, and skim milk when fed to pigs gives rise to hams and bacon of the very finest quality. In the cured produce from pigs so fed the fat is firm and white in texture, while its odour and flavour can best be described as purely

"ham." However long the maturing process, the fat positively does not become rancid, but remains white in colour and no objectionable odour develops. The ration described is remarkable in that it contains practically the minimum amount of oil that it is possible to find in natural feeding stuffs.

Moreover, further inquiry also elucidates the fact that the pigs from dairying and cheese-making districts (as, for example, Cheshire, Ireland, and Denmark) furnish in general carcases whose fat is of good quality. Where skim milk is employed, a larger proportion of maize meal may be fed without influencing the composition of the fat. Thus one is led to the inevitable conclusion that the factor which determines the quality of the fat must be the proportion of oil in the *whole ration*, and not in any one of the components of the ration.

If this assumption be conceded, one is able at once to foretell whether a given ration will produce inferior fat in pigs. Examination of a large number of cases has led the writer to conclude that, *if the amount of digestible oil in a balanced ration does not exceed 2½ parts per* 100 *of total digestible matter, inferior fat is not likely to result*. By applying this criterion, the pig-keeper is enabled to work out a number of mixtures of feeding stuffs which will fulfil all requirements. In the first place their prime cost must be reasonable; secondly, the rate of growth must be economical; and lastly, the quality of the fat will be satisfactory.

Effect of Excess of Food-Oil.

What actually, however, is the meaning of this conclusion that a maximum exists for the amount of oil in the ration? It appears reasonable to suggest that, though a pig may be supplied with alternative types of fuel or energy-producing substance such as carbohydrate, he will always consume or destroy a certain amount of the oil in his ration, as represented by this figure of 2½. If the oil exceeds this proportion, he is unwilling or unable to destroy it, and therefore he decides to store the oil up as a reserve.

Thus the amount of the excess of oil (above 2½ per cent.) in the ration largely determines how soft the carcase fat shall be, whilst the nature of the oils present will determine the intensity of the softness and the character of the rancid products.

Another interesting point arises in connection with the use of meat meal and similar products. In general, meat meal may contain from 10 to 15 per cent. of "oil," and by virtue of the origin of the meat, this oil is invariably a solid fat. One would thus be inclined to suggest that the inclusion of meat meal in a ration would tend to harden the carcase fat. But this suggestion is found to be incorrect in the majority of cases. If the ration contains 10 per cent. of meat meal, the amount of "oil" in the ration is thereby increased by 1 or 1½ per cent. The remaining constituents of the ration will be, almost invariably, derived from barley, maize, oats, wheat offals, etc., and from the iodine value of the oils in these cereals it can easily be shown that this paradoxical result may be expected—namely, the addition of a solid fat to the ration may actually give rise to softer fat in the carcase.

The most interesting and controversial example of the effect of food on fat quality is provided by the employment of fish meal for pigs. Although a number of feeding trials have been carried out, in order to prove that pigs can be fed on fish meal without a fishy taint arising in the carcases, bacon curers have yet persisted in opposing the use of fish meal for pigs. The grounds for this opposition are many. We may first of all point out that the main factor which determines whether fish oil shall find its way into the carcase is the proportion of oil in the *whole ration;* whereas the advocates of fish meal persist in their attitude that the amount of oil in the fish meal itself is the important thing. They also suggest that any risk of taint in the carcase can be obviated if the fish meal is withdrawn from the ration for 2 or 3 weeks before killing; but the writer has always failed to understand why this expedient should result in dislodging any fish oil which is already *in situ* in the fat reserves.

The Fish Meal Problem.

It is also suggested that, if fish meal were as harmful a food as the bacon trade suggests, why is it purchased so largely by Germany?

The answer to this is twofold. In the first place, very few pigs in Germany are converted into bacon and hams; almost all of them are cut up and sold in the fresh state, as sausages, etc.; in this form there is no opportunity for rancid changes to take place, such as usually appear to be required for the production of fishy taint. Secondly, the Germans, with their well-known acumen for economical processes, are believed to submit a great deal of their purchased fish meal to solvent extraction, thus completely removing the oil whch causes the trouble.

Another interesting matter crops up in connection with the safety limit of 2½ per cent. of oil which has been mentioned above. I have suggested that the pig appears to destroy up to this amount of oil in his ration, and that it cannot be transferred to the fat reserves. The amount of oil destroyed must, however, be assumed to depend in some way upon external conditions, and it is thus necessary to bear in mind that climate, weather, method of housing, the number of pigs in a pen, the amount of exercise allowed, the type of bedding employed, and dozens of other factors may be expected to affect this figure in one direction or another. Moreover, pigs differ in personality, as do human beings, and even the members of one litter will not grow at the same rate. Thus, in borderline cases, when the ration contains about 2½ per cent. of oil, it is not surprising to find all qualities of fat from firm to soft in one lot of pigs. For absolute surety in this respect it is obviously not sufficient to keep the amount of oil just below this limit; a good margin of safety should be observed.

I have endeavoured to show that the composition of pig carcase fat can be profoundly modified in accordance with the feeding of the animal. Similar considerations apply in the case of cattle and sheep, and also with regard possibly to milk and its products, although one may admit that pigs furnish by far the simplest case.

(*Continued on p.* 297.)

Aluminium in the Meat Industry

By G. SELIGMAN, B.A.

The utility of aluminium in the handling of meats is treated under three headings: (1) The chemical interaction between meat and aluminium; (2) suitable uses for aluminium plant; (3) physical and mechanical properties and methods of construction.

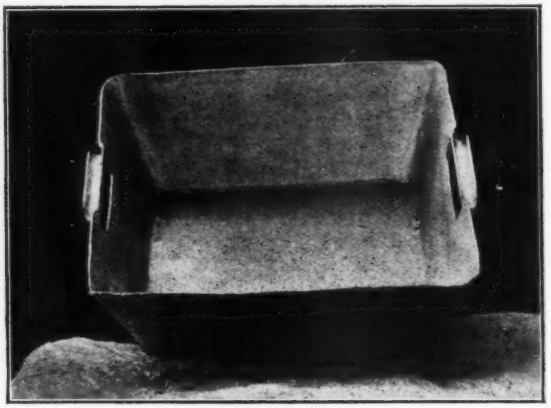


FIG. 1.—An untouched Photograph of a Tray used Daily for Six Years in a Large Midland Sausage Factory.

This shows that it has stood up well to everyday handling owing to the thickness of the metal. Note the complete absence of chemical action on the aluminium.

IN THE LABORATORY aluminium has been found to be resistant to stearic acid, oleic acid, and kindred substances. In practice this is confirmed by the extensive use of aluminium for the plant in which these acids are treated and prepared. Compounds of these acids, of course, occur in meat and give rise to contaminating salts when in contact with iron and copper. A piece of meat laid on an iron slab will develop black stains in the course of a few hours, for example; if for the iron, copper is substituted greenish stains will develop, and these, of course, are poisonous.

FIG. 2.—Tipping Steam-jacketed Pans.
In the kitchen of a large London catering house.

Chemical Interaction.

The writer has had the opportunity of inspecting in the course of years a large number of aluminium vessels used for the *holding* of meats, and in no case has he seen one corroded. In so far as pans used for *boiling* meats are concerned, corrosion troubles were experienced in one factory, but they were traceable to incorrect handling of the pans *after use*, and the food product contained in them could therefore be absolved from blame, which was due to the method of treatment employed.

In recent years the pans in the factory in question have, it is stated, been entirely satisfactory and no

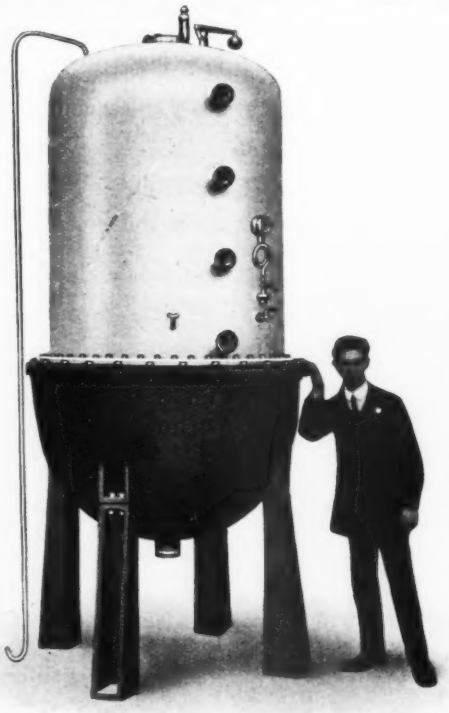


FIG. 3.—A General Form of Digester, or Fat-rendering Vessel.

recurrence of the trouble has been experienced. No other case of corrosion has been seen by the writer. It may therefore be said that both in theory and in practice there exists no interaction between meat and aluminium.

It is sometimes feared that excess of salt may have a deleterious action on aluminium, which is natural, for if a vessel were used to boil nothing but a solution of salt day after day, the vessel would, of

FIG. 4.—An Insulated and Encased Steam-jacketed Pan, with Counter-balanced Cover.

course, corrode. Nevertheless, it is found that if salt is in contact with meat there is no action. The commonly accepted explanation of this is that the fat in meat acts as a protective agent, probably by forming a thin coating on the surface of the metal, which protects it from actual contact with the salt. An interesting parallel case is that of milk. Lactic acid by itself has, under certain conditions, a strong corrosive effect upon aluminium, but when the lactic acid is in contact with the aluminium in conjunction with milk no action takes place. In this case the milk contains ingredients which protect the aluminium chemically.

The food manufacturer who possesses aluminium vessels is safeguarded by an important property of this metal. Suppose that corrosion of the aluminium were to take place; say, for example, that a careless operator has left a batch of salt in a vessel for many days and then emptied it away so that the products of corrosion remained behind. What would happen? It is a fact well known to chemists that whatever may cause the corrosion of the aluminium, the substances formed—usually salts of aluminium—are entirely harmless to the human system. It may therefore be said that aluminium cannot, under any conditions, contaminate a food product.

FIG. 5.—Aluminium Bogie Waggon, for Chopped Meat, Sausage Meat, Condiments and Similar Substances.

Applications.

The most extensively adopted aluminium vessels for the cooking of meats, meat products, blood products, and fats and similar substances, are steam-jacketed pans.

The reason is clear. The heat conductivity of aluminium is good, the surface is clean, and these two qualities are possessed by few, if any, other commercial metals, which possess at the same time the properties already described.

Aluminium lends itself well to the manufacture of all kinds of carrying vessels owing to its lightness. It is also used quite largely for bogies for transporting meat from one place to another within the factory. These are also of use in handling condiments, spices, and so forth.

FIG. 6.—"Double-container" Ham Cooker. A recent development.

Aluminium has never been successful for brisket moulds or apparatus of that kind, owing to its high cost compared with tin-ware. Manufacturers have always felt that while tin-ware was by no means ideal for meat moulds, the disparity in cost was too great to justify the use of aluminium. This disparity is more pronounced in the cost of this type of vessel than in the majority of articles made in aluminium, though the reason need not concern us here.

Everyone is conversant with the various ham cookers on the market, and in almost all cases aluminium is the metal of which the body is constructed. This is usually made of strong cast metal, to withstand the heavy wear which all ham-boiling apparatus has to stand. Made in this way these cookers have proved sound mechanically as well as efficient in other ways.

Aluminium is employed with good results for "fat rendering," the general type of apparatus being shown in one of the illustrations (Fig. 3). A pale and pure product and economy of steam are the important factors here.

Behaviour towards Gelatine.

In the preparation of gelatine aluminium is extensively used, and the writer does not know of a

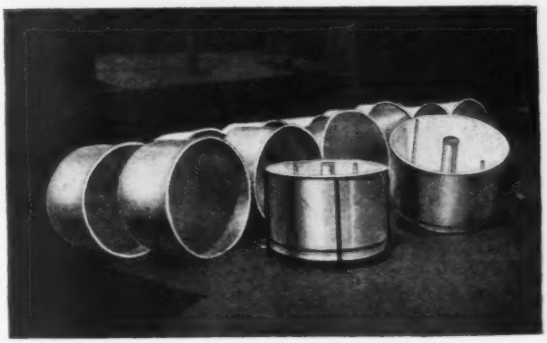


FIG. 7.—Gelatine Extraction Tanks, with Coils and False Bottoms.

FIG. 8.—Reinforced Carrying Pan.

modern gelatine factory which has not installed a considerable amount of aluminium plant.

Large melting tanks with coils and false bottoms, intermediate storage vessels, gutters for gelatine liquors, and bogie waggons are commonly used. Evaporating pans are also said to be in satisfactory employ, although the writer has no definite information about these. Aluminium wire is sometimes used for drying gelatine sheets. Cooling trays are still in wide use.

Aluminium is valuable for these purposes, as it ensures a pale colour and the absence of copper in the finished product. Moreover, owing to the smoothness of its surface absolute sterility can be guaranteed. Wood vessels, on the other hand, secrete bacteria and are never sterile except when quite new.

Although aluminium is widely used in the gelatine factory it is not to be recommended for vessels intended to hold a solution of finished gelatine, as, for example, in glazing operations. Here definite corrosion of the metal has been shown to exist. The reason for this curious and contradictory state of affairs is probably due to the protective influence of minute quantities of fat in the early stages of the manufacture of gelatine and the absence of water in later processes, whereas in handling a solution of finished gelatine, water is present but not fat. Salt may also be present.

Physical and Mechanical Properties.

The weakness of aluminium lies in its softness. Aluminium has, in the past, failed signally for many purposes for which it was originally hailed as the ideal metal, owing to its not being able to stand up to the stress of factory usage. This weakness entails responsibility upon the manufacturer of aluminium apparatus; he must be careful for what purposes he recommends the metal, and he must design his plant with the utmost care.

In so far as steam-jacketed pans are concerned, no great difficulty exists since the pressures used are comparatively low. All that is necessary is to select metal of sufficient thickness and that problem is solved.

With carrying vessels the problem is different—here there are actual blows to be withstood. These are sometimes guarded against by the provision of a mild steel supporting framework, of which an example can be seen in the carrying-pan shown in Fig. 8. Another method is to thicken the aluminium considerably. Fig. 1 shows a fairly stout-walled container, one of several thousand which have been in continuous use for six years for carrying meat. It is dented, but in perfectly good condition for doing its work, and should still have many years of life before it.

FIG. 9.—A Well-known South of England Potted Meat Factory, showing Aluminium Steam-jacketed Pans.

The Utilisation of Meat Products

Some Interesting Glandular By-Products of the Meat Industry

By D. J. ANTHONY, M.R.C.V.S., D.V.S.M.

A discussion of the origin and functions of the better-known preparations now being increasingly used in gland therapy.

WASTE ELIMINATION has always been the aim of enterprising people in the meat industry, and nowadays that industry leads all others in the utilisation of material that in years gone by was simply burnt or otherwise destroyed. It is no longer necessary to prohibit "the dumping of offal into the Thames at London Bridge," as no meat trader now regards "offal" as something to be discarded as entirely useless. The number of industries formed for the utilisation of meat products is continually increasing, and the mention of only a few, such as the tanning industry, triperies, fertiliser plants, bone and blood meal factories, poultry foods, etc., enables one to obtain some idea of the ramifications of these by-product industries, all of them being subsidiary to the meat industry.

A comparatively new branch is the manufacture of the so-called "glandular products" and extracts for use in medicine. Before gland therapy became so popular in human and veterinary medicine, the various glands and organs from which extracts are obtained were either sold with the usual commodities in the butcher's shop or else thrown away as being of no value from the butcher's point of view. Now, such organs may be disposed of to large firms of manufacturing chemists for the production of medicinal extractives, or, as in the case of the larger packing houses, such preparations may be manufactured by the meat traders themselves, a special staff of scientists being employed for the purpose.

Pituitrin.

A preparation used extensively in both branches of medicine, "pituitrin," is composed of the active principles of the posterior lobe of the pituitary body (*Hypophysis cerebri*). This small organ is found attached to the under surface of the brain by means of a delicate stalk. It is oval in outline, and about half an inch wide in cattle. The posterior part is the glandular portion, and it is from this that pituitrin is manufactured. The pituitary body is essential for life, and its total removal may have fatal results in a few days. Apparently it is the removal of the anterior lobe that is fatal, even partial removal producing a condition of atrophy of the sexual organs with great increase in body fat. If the operation is performed before adolescence there is a persistence of sexual infantilism. Injection of anterior lobe extract, or transplantation of the organ from another animal, relieves these symptoms. Pituitrin causes a rise in arterial blood pressure, and a contraction of certain muscle fibres, notably those of the uterus, and for this latter reason it is often a valuable aid in cases of delayed parturition, post-partum hæmorrhage, etc. It also causes a flow of milk in lactating animals, and a dilatation of the kidney bloodvessels.

Another useful organ found in the brain is the "pineal body" or gland (*Epiphysis cerebri*), the so-called third eye, a small ovoid body found on the upper surface of the brain between the cerebrum and cerebellum. In certain lizards and fishes the pineal body is well developed, and may be paired, one part corresponding to the pineal gland, whilst the other becomes developed into an eye-like structure situated centrally on the upper surface of the head beneath the skin. Extracts from the pineal gland are used in the treatment of cases of retarded mental development.

The Thyroid Gland.

The thyroid gland consists of two lobes about three inches long in cattle, reddish in colour, lying on either side of the larynx, and connected by a middle lobe or "isthmus." Embedded in each lateral lobe of the thyroid are the "para-thyroids," which are often very difficult to differentiate from the thyroid itself. Cretinism is a species of idiocy produced as a result of disease or lack of function of the thyroid gland. In adults, a condition of over-fatness and slowness of mind and body called "myxœdema" is due to lack of thyroid function. The thyroids are "ductless glands" and produce an internal secretion. In disease this secretion may be lacking, and it may then be replaced by injection of thyroid extracts, grafting healthy glands from other animals, or feeding on thyroid preparations. The thyroid contains iodine—"thyro-iodine"—which is present in combination with protein matter in the colloid substance contained in the cells of the gland. "Graves' disease," or "exophthalmic goitre," is caused by overactivity and hypertrophy of the thyroid. Administration of thyroid in healthy people causes an increase in nitrogenous metabolism.

The "para-thyroids" are usually four in number, embedded in the thyroid substance. They contain no iodine, and their removal sets up a train of nervous symptoms. Their normal function appears to be the neutralisation of guanidine, a poisonous substance derived from the creatine of muscle. Accumulation of guanidine causes tetany, hence the muscular twitchings produced on extirpation of the parathyroids. Medicinally, the parathyroids are used in cases of *paralysis agitans*, and to control muscular metabolism.

In the neck of young animals is the "thymus gland," or "throat sweetbread" as it is known to butchers. This gland attains its greatest size soon after birth, and gradually diminishes until hardly a vestige remains in adult life. It is a ductless gland weighing from about 15 to 25 ounces in a calf six weeks

old, and it then extends from the thyroid in the neck to the third rib in the chest. Although it is one gland, it is divided by butchers into a "throat" and "heart" sweetbread. There appears to be some relation between the thymus gland and the generative organs. Atrophy of the gland is retarded in castrated animals, and removal of the thymus hastens the growth of the testes. The sweetbread is a favourite invalid food, and is used in medicine in the treatment of rickets. In hibernating animals this gland persists throughout life, and it acts as a fat storehouse, so that there is always a supply of fat available for combustion during the winter sleep.

The Suprarenal.

Another important ductless gland whose extract is used extensively in medicine is the suprarenal gland or adrenal body. These are two in number, about three inches long, brown in colour, and situated in the fat next to the kidneys. The importance of these glands was first indicated by Addison, who showed that the condition afterwards called "Addison's disease" is due to alterations in these glands. Removal of the adrenals is invariably fatal. The extract obtained from these glands is called "adrenaline," but it is not a cure for Addison's disease. It was isolated in 1900 by Dr. Takamine. The yield per animal is very small, and it is estimated that it takes 20,000 cattle to yield one pound of adrenaline. It is a powerful hæmostatic, and is used extensively to check bleeding. It has also been used in combination with cocaine and other local anæsthetics, to localise the anæsthetic, owing to its action on the bloodvessels. It is sometimes used as a heart stimulant, and is said to be useful against cobra bites.

The Spleen.

The spleen, or "melt" as it is called in the meat trade, must also be classed as a ductless gland. In cattle the spleen is an elongated organ averaging about twenty inches long by six inches wide by one inch thick, and is found attached to the rumen or first stomach. The spleen is composed of a framework containing the "spleen pulp" of dark red colour. Removal of the spleen is not fatal, as the lymphatic glands of the body can perform its functions. The spleen is the organ dealing with the manufacture of white blood corpuscles, and also for the breaking down and repair of the red blood corpuscles. It also assists in nitrogenous metabolism, particularly in the formation of uric acid, and it is often prescribed medicinally owing to its large hæmoglobin content, for the sake of the iron it contains.

Some other useful by-products are the extracts made from the sexual organs—*e.g.*, testicular extract from the male animal and ovarian extract from the female. It is known that the testicles and ovaries produce, in addition to the cells necessary for the perpetuation of the species, an internal secretion which exerts a profound influence on the body. These extracts are of use in cases where the organs are diseased, or where their surgical removal has been rendered necessary. Ovarian extract is used extensively in various diseases and abnormal conditions in women. The *Corpus luteum* of the ovary is also used for similar purposes. In the male, an extract from the prostate gland—a lobulated mass lying at the neck of the bladder—is used for lowering blood pressure.

Insulin.

No list of these glandular extracts used in medicine would be complete without a mention of the pancreas, or "belly sweetbread," from which insulin is manufactured for use in cases of diabetes and other conditions. The liver has lately come into prominence for the treatment of anæmia, and numerous preparations of liver are now on the market. Extracts from the brain and spinal cord have also been utilised in medicine, as also have preparations from various lymphatic glands, bone marrow, and blood. Following on the pioneer work of Leibig, the manufacture of meat extracts has progressed considerably, and numerous other instances could be quoted showing the use made of all parts of the animal body, as, for example, the manufacture of artists' "camel hair" brushes from the fine hairs found inside the cow's ear, "catgut" ligature for surgical work made from sheep's intestines, and the fine outer covering of the *cæcum*, the so-called "goldbeater's skin," utilised so extensively during the war in airship manufacture.

(*Continued from p.* 291.)

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The Detection *of* Spoilage *in* Meat *and* Fish

The Line of Demarcation

An Abstract of the Report of the Committee on Meat, Fish, and Shellfish, presented to the Foods, Drugs, and Nutrition Section of the American Public Health Association, at the Fifty-seventh Annual Meeting, held at Chicago, Illinois, U.S.A.

IT IS sometimes difficult to say with accuracy whether food is spoiled or not. Degrees of spoilage range from the practically normal to a condition of putrescence. Aside from the ordinary organoleptic tests—such as appearance, odour, and taste—few really satisfactory criteria or tests for spoilage are known. The cases of most importance are those incipient, doubtful, borderline cases so often come across in food inspection. In 1927 the consumption of meat *per capita* in the United States amount to 140 pounds; of fish and shellfish about 18 pounds. Meats and fish are particularly favourable pabula for the rapid bacterial growth and the production of toxins. Ammonia, hydrogen sulphide, indol, amino acids, trimethylamine, free fatty acids, etc., are found in certain types of meat and fish spoilage.

Weinzirl's Definition.

The author surveys some of the more important contributions to the literature of meat and fish spoilage, with particular reference to methods of detection. Weinzirl[1] has given an excellent description of the spoilage process in biological terms, where he states that "spoilage is a complex process, in the first place a scouring of the meat, due to fermentation of the carbohydrates present by aerobic, facultative, and anaerobic bacteria, and, secondly, to a digestion of the proteins by aerobes and facultative anaerobes without abundant evolution of sulphides; thirdly, the production of indol, skatol, and other organic compounds by aerobic and anaerobic bacteria; and, fourthly, to the action of anaerobes producing sulphur compounds." Spoilage may be due to the cell enzymes alone, such as autolysis. Fellers and Parks,[2] Hunter,[3] and Almy[4] have studied certain types of spoilage in crabs, salmon, and sardines which are autolytic rather than bacterial in nature. On the other hand, where micro-organisms are present, the spoilage process is still due to extracellular enzymes elaborated by them. Effront[5] has made a detailed study of the course of decomposition.

During progressive decomposition of fish and meats, the bacterial flora undergoes a profound change, some species forming acid, others breaking down proteins into peptones and amino acids, and others to still simpler nitrogenous compounds. Certain bacteria are able to produce ammonia and hydrogen sulphide, others indol, and others trimethylamine. Some species of bacteria may form all these compounds, though they are bacteria incapable of producing any deep-seated changes in foods,[6] and it is to the latter group that many food poisoning organisms belong. Putrefaction is due to anaerobic bacteria alone. The researches of Hoffstadt,[7] Weinzirl and Newton,[8] Carey,[9] LeFevre,[10] and Brewer[11] show that whilst meat is often grossly contaminated with bacteria, there appears to be no definite correlation between the quality of the meat and the bacterial count. The Weinzirl[12] anaerobic spore test is useful, and Hoffstadt states that the presence of proteolytic anaerobes is a definite way by which the keeping qualities of meat can be predicted. Aside from the anaerobic spore test and total counts of bacteria, little of value has been obtained by bacteriological means.

Biochemical Tests.

Tests for the detection of decomposition in meats, fish, and shellfish, investigated by Arbenz,[13] found biochemical tests only of value in the later stages of spoilage. Methods of determining amino acid nitrogen to indicate the stage of decomposition in meats and fish were investigated by Luttge and von Mertz.[14] Ottolenghi,[15] Waksman and Lomanitz,[16] and Hoagland.[17] The pH value of the serum using the quinhydrone electrode has been applied by Herzner and Mann.[18] Eber,[19] Richardson,[20] Sears,[21] and McGuire[22] have studied the nitrogenous bodies in fresh and spoiled meats. Clough[23] has carried out some valuable researches on the spoilage in canned salmon. Harrison[24] and Linden[25] have shown that pH values are of considerable importance in detecting spoilage in oysters. Weaver,[26] Kifrr,[27] Almy,[28] and Kerr[29] have shown that the normal ratio of water to protein in meats is 1 to 4, variations from this ratio indicating either loss of nitrogen or the addition of water. Kuhn[30] found that a positive isonitrile reaction furnishes an indication of incipient decomposition. Horowitz-Wlassowa[31] has shown, as the result of extensive researches, that the hydrogen ion concentration, refractive index, and the biuret reaction of the meat extract give no indication as to the freshness of meat and are of no value in determining its edible properties. Katrandjieff[32] states that the iodine absorption test is of no value in detecting meat spoilage.

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(Continued on previous page.)

Glass Packed Chicken

By C. R. FELLERS AND E. P. GRIFFITHS*
Massachusetts Agricultural College

THE CHICKEN must be of original high quality, must be very carefully handled, cooked, carved, and packed into jars with an artistic hand and, most important of all, processed for a very long time to make it keep.

At best, meats and chicken are difficult to preserve, and are even considered unsafe by the U.S. Department of Agriculture unless processed with the aid of steam pressure. At any rate, except upon the farm, chicken is but seldom canned, and even here the percentage of failures is large. There is also a skilled technique in doing the job that can be acquired only after much experience.

In 1910 among those who had made the attempt to can chicken was F. B. Fisher, of North Leominster, Mass. Like many others, he had also encountered failure and discouragement. But his curiosity was aroused, and a naturally investigative turn of mind and keen observation brought him success. During the long winter days, when work was slack on the farm, many a chicken was sacrificed to the "spirit of research." With experience, however, came art. And an art it certainly is properly to cook, cut up, and remove the bones of the chicken to obtain the maximum quantity of whole pieces of meat of just the correct shape, consistency, and colour. Again, an artist must pack the pieces into the various sized jars.

So in 1912 Elmwood Farm began to pack chicken in glass in a small way. The product proved so attractive that business grew apace. Within a few years the home kitchen had to be given up. New quarters, including small but model kitchens, dressing-rooms, and packing equipment were constructed.

After about ten years the old factory was again found to be too small. Demand for Elmwood Farm Chicken Delicacies had extended beyond the boundaries of the state. A thorough renovation of the old plant, together with a modern addition, was made. New equipment was installed, and the packing operation became essentially a progressive packing system. That is, the frozen chickens came in at the basement, and the cased goods were trucked out of the second floor to the warehouse or trucks.

Somewhat over 300 tons of poultry were packed in 1928; that is, a ton to the working day. There are approximately 450 birds to the ton, or 4·4 lbs. per bird. The percentage of meat without bones in the fowls varies from 30 to 38 per cent. of the original weight. A dressed fowl weighing 3 lbs. will give about 22 to 24 ozs. of meat. There are, of course, always some left-overs and many fragments. These are not wasted; in fact, nearly every part of the fowl is utilised for some purpose.

The freshly killed chickens are singed, washed, and dressed. When frozen fowls are used the birds are thawed out, the de-frosting requiring several hours at ordinary temperatures. An incision is made in the abdomen and the entrails more or less completely removed but kept beside the bird on trays. These trays are carried by a slowly moving belt to the U.S. Department of Agriculture inspector, who examines every bird packed. By removing the viscera, diseased organs (particularly the liver) are exposed to the inspector's trained eye. Discoloured livers or any diseased organs are discarded. If avian tuberculosis is present, the whole carcase may be thrown out if the lesions are at all generalised. This is done in spite of the fact that avian tuberculosis, unlike the bovine, is not transmitted to man. The inspection service is not compulsory and is administered by the U.S. Department of Agriculture, Washington.

In spite of the added cost of the inspection, Mr. Fisher feels that it is invaluable. It serves as a guarantee or seal of purity and safety to both packer and consumer.

Leaving the inspection table, the entrails are removed, the giblets separated, and the chickens are cooked in steam-jacketed kettles with a little water until the meat can be separated easily from the bones. A convenient test is to determine the point at which the wing-ends readily break off under gentle pressure.

Processing.

Upon removal from the cooking kettles, the chicken is placed on the cutting and picking tables, where the birds are carved and the meat removed from the bones. The white-clad women at these tables are indescribably adept in doing this work. The bones are "picked clean," both figuratively and in fact. The white meat is usually separated from the dark. Both are passed along to the packers, who deftly pack the meat into jars. The larger pieces of white meat are layered around the glass and the centre space filled with smaller pieces. Boiling hot chicken jelly is added just before sealing. Thence the jars pass to the retorts for the final sterilisation. The retorts are equipped with automatic temperature recording instruments and controls. A temperature of approximately 240 degrees for from 40 to 90 minutes is used, according to the size and type of jar. This rigorous heat treatment insures freedom from spoilage. Prompt water cooling, under air pressure to keep the caps from blowing off, is an additional feature of interest. Great care is taken in inspecting and handling the jars, not only because of the high cost of the product, but to preclude any possibility of spoilage later on. Special composition gaskets are used on the caps to withstand the fat present.

The jelly is made from the skin and bones of the chickens. These are boiled up in steam-jacketed kettles to extract the gelatin (collagen) from the bones, carefully concentrated and flavoured. The

(*Continued on p.* 294.)

* Reprinted from *The Glass Packer*, August, 1929.

Vanilla: Cultivation, Grading and Marketing

By DR. H. DRAKE-LAW

PART I*

Reliable information relating to the cultivation and preparation of vanilla is difficult to obtain as it is in the hands of a relatively small class of experts. We publish below the first of three articles in which a well-known authority will survey the whole subject.

THE VANILLA "bean" is not really a bean at all. Out of the flower of a certain beautiful, fragrant, reddish-brown and white orchid (*vanilla planifolia*) there grows a pod, filled with tiny seeds. This pod derives its name from the Spanish *vaina*, meaning a pod, and *-illa*, which is the diminutive.

There are in Madagascar, the Comores, Reunion, and Mexico rich lowlands where the air is damp and hot, the soil is loose, and the sun filters through the trees to make patterns of sunshine and shadows on the ground. That is where vanilla grows best.

"Vanilla Planifolia."

Vanilla is "planted" by setting slips from strong, fruitful vines into loose soil, and allowing them to climb. Sometimes the vanilla is set so that it will climb trees which are already growing. Poles or especially planted trees, arranged at regular intervals, support the vine. The undergrowth is cut back to about eight inches, so that it will be heavy enough to keep the moisture in the ground, but not high enough to shade the low-hanging beans.

The vanilla vine is of a zigzag shape, with joints six inches long and a long, dark green leaf at each joint. When slips from vanilla vines are planted (a slip is usually five joints long), the two lower joints are stripped of their leaves, planted at the foot of the tree, and covered with soil, rotted leaves, and undergrowth. These two joints form roots which creep along the ground, beneath the decayed leaves and vegetation, for several hundred feet.

The three upper joints, which have been tied to the tree, zigzag their way up the trunk. At each joint they send out two velvet feelers which reach around the tree as you would with your arms. Very little of the nourishment of the vine comes from the ground. Most of it is taken from the air or from the tree by these feelers or aerial roots.

Pollination.

When vanilla grows wild (and there are dozens of kinds of wild vanilla), it will climb as high as a two-story house. But the planter remembers that it is the hanging vines which produce the flowers, so he keeps the stems turned down and does not let them get too far out of reach. Hanging vines, on the other hand, must not touch the ground. He pinches the ends of the stems to prevent this. Careful pruning is necessary, too, or the strength of the plant will be wasted in growing rank wood and vine, instead of flowers and pods.

The vanilla flower is reddish-brown and white, bell shaped, with single, separate petals. Before it will bear fruit, this blossom must be fertilised.

In Mexico there is a small insect which will pollenise the vanilla, carrying pollen from one flower to the stigma of another. At the first attempt to grow vanilla outside Mexico, it was found that no pods appeared. The choicest vines were taken to Madagascar, and Mexican soil was sent there, but without success.

At last it was found that artificial pollination (which was at that time becoming more widely known and used) was the real solution of the problem. Planters in Reunion, an island near Madagascar, off the east coast of Africa, were the first to employ artificial pollination in vanilla culture with success.

Artificial fertilisation is easily accomplished by the aid of a slightly moistened forked stick. This work is done by the natives, who call the process the *mariage de vanille*.

Artificial pollination was successful from the first. In fact, it proved even better than the natural method. A planter would fertilise only a moderate number of the most promising looking blossoms. These, and only these, would bear pods. So, instead of using its vitality to produce a great many pods, none of them of high quality, the vine could be made to impart all its strength to a moderate number of pods, producing fine long beans.

Vanilla Sources.

Through this fertilisation, it became possible to grow good vanilla in many other countries besides Mexico, although there, in the home of the plant, the choicest crop is still raised.

In the French East Indian Islands of Madagascar, Comores, and Reunion, and the nearby British islands of Mauritius and Seychelles, located off East Africa, are grown vanilla beans of excellent quality and aroma. These are called "Bourbons" from the fact that the Island of Reunion was once called the Island of Bourbon.

The French West Indies, too, especially Guadeloupe and Basse Terre, grow the fine "South American" beans. The "Java" beans of the Dutch West Indies are a similar product.

Next in the scale come the Tahiti beans, of good flavour. Least desirable are the vanillons or wild vanilla beans grown in South America.

In each of the vanilla-growing countries, the vines are cared for in the following manner:

After the fertilisation, in which men, women, and boys take part, the planter's hardest work is done. The pods begin to appear very rapidly. During this time the planter must watch the hanging beans, to make sure that they grow straight. If he neglects

* The succeeding parts will be:
II. The Uses of Vanilla.
III. Blending and Adulteration.

this (and many planters do) he will have deformed beans, which are of less value than the straight, perfect ones. He must keep the stubble cut back, too, and the *machete*, a long knife, must often be used to keep the trees trimmed, lest they give too much shade.

Shortly after the flowers have dropped, a number of pods also fall. Those left grow in bunches resembling thin bananas, six to ten beans to the bunch. The best beans are eight to ten inches long, the lower grades, only five inches or less. All are yellowish-green and banana shaped. Watery and tasteless, they lack the pleasant aroma of vanilla which must be brought out by curing.

The vine is now maturing, too. Its leaves begin to turn russet-brown. The pods grow less and less green, more and more yellow. A hard black speck forms on the tip of the bean. The vanilla is ready to cut.

Curing.

In the sunshine quilted shade of tropical trees, swarthy men and women and boys, singing and shouting, gather the vanilla crop. They cut the clusters, stem and all, from the vine, and throw them into sacks.

A preparer cuts off the stems. The beans are taken to the place where the curing is to begin, usually in a nearby town. The method of curing varies a little in different countries, but the main idea is always the same. The beans are first heated in a large room, called an oven, then exposed to the sun and air and afterwards put in a tightly closed place where they will "sweat." Then comes sunning again and sweating. The process is repeated many times until the delicate hidden flavour of the bean has been brought out. The yellow colour changes to a rich brown, and the banana-like shape is dried out until it resembles a long, thin cigar.

Sometimes the beans are prepared for curing by plunging them into hot water. Sometimes they are scratched deeply enough to allow the escape of the moisture, and sometimes nature is given her own way and the curing process is begun by exposing the beans to the rays of the sun. The beans are sorted according to length, and imperfect beans, "splits," or "cuts," whose flavour is not so delicate, are kept in a class by themselves.

By day, when the weather is fine, the beans, on drying frames, are exposed to the sun. At night they are wrapped in blankets, or put in strong wooden sweating boxes, which are covered with straw mats so that the heat cannot escape. If the weather is wet the beans are moistened, blanketed, and heated in ovens. The heat is moderate and is varied in accordance with the size of the beans. They are exposed to the air and heat, by turns, until they are cured. But sun drying is preferred, for beans cured in this way will usually keep better.

The Curer's Art.

After all, however, sun, air, blankets, sweat boxes and ovens, and all the rest are not the only important elements in the best curing of vanilla beans. Very important is the man who does the curing.

It requires much experience and skill to know just how to treat each bean, how to expose it to the sun just long enough to bring out all its delicacy, yet not long enough to have it touched by sunburn; how to secure the rich, waxy, chocolate colour and the matchless aroma that goes with it; how to dry out the water in vanilla so as to make the beans fine and pliable, but not mushy. All this constitutes an art.

The beans, by this time, have lost a good deal of their weight. Four to six pounds of uncured beans make only a pound of those ready to market. After being straightened, they are graded according to size, aroma, and soundness. Then they are ready to be bundled and shipped.

Marketing.

"Bourbons" are mostly sold in "Round Lots" or lots of "Heads and Tails," as they are also called. A "Round Lot" comprises all grades of a gathering exactly as it goes through the curing station—that is, firsts, first splits, seconds, second splits, thirds, third splits, ordinaries, inferiors, ordinaries and inferiors, splits, and a little "vrac."

"Mexicans" are graded as prime, good, fair to good, ordinary, and "cuts." "Vrac" and "cuts" are imperfect beans, the odds and ends which the curers have left over when they have bundled all the other grades. They are packed loose in large boxes.

About one and a half million pounds of vanilla beans are prepared in different parts of the world in a year. Bourbon beans, from Madagascar and the nearby islands, form over half this total, Tahiti beans a sixth, and Mexicans a sixth; the rest of the crop consists of South American beans, Javas, and wild vanillons.

Marseilles is the world market for "Bourbon" vanilla. From there, the vanilla beans are exported to all parts of the world. Many will be used for flavouring chocolate, without being made into extract. Some will be used in making perfumes; but by far the greater part of the crop is used in making vanilla extract.

(*Continued from p. 292.*)

jelly sets firmly when cold and keeps the pieces of chicken in place in the jars. Six sizes are packed—*i.e.*, Flat 14 oz. and 10½ oz., and Tall 20, 8, 6½, and 4 oz. An especially fancy pack in 20 oz. jars contains all the meat, except fragments, of a 4½ lb. chicken.

Chicken *à la* King is made from the tender pieces of meat with eggs, butter, whole milk, mushrooms, pimentos, and peppers. This delicious product is packed in Tall 6½ oz. and Flat 10½ oz. jars. Devilled potted chicken and chicken livers (paste) are hors d'œuvres which are gaining in popularity with the trade. Both are packed in 4 oz. tall jars.

Chicken broth is the concentrated juice of the chickens (from the kettles) with small pieces of meat, rice, and flavour. This high quality product is packed in No. 1 tall cans.

High-grade canned dog food is made from the heads and scraps. The entrails are daily hauled away from the factory by hog ranch operators.

Elmwood Farm employs about fifty hands, and in 1928 approximately 1,000,000 jars were produced.

Legal *and* Chemical Aspects *of the* Pectin Controversy

By DR. R. SUCHÁ-RIPA

Chief Chemist, Pomosin-Werke, G.m.b.H., Frankfurt a/M. Author of "Die Pektinstoffe," etc.

Pectin, a natural means of jellying, has within a short period replaced all artificial aids to "setting" in jams and marmalades. An authority of international reputation discusses some of the problems in connection with pectin with which food chemists are faced.

AGAR-AGAR, gelatine, starch and other added matters, formerly in wide use, have been completely discarded in favour of pectin. Pectin is a fruit ingredient and therefore, when added to preserves, not a foreign matter. Not only is there hardly any difference in taste, but it is impossible for chemists to say whether the pectin in a given jam is a natural ingredient or has been added during the process of production. That is, of course, if the added pectin is within normal limits, say, 0·6 to 0·8 per cent. Naturally, there are fruits with a very low pectin content—strawberries, raspberries, bilberries—and if the products from such fruits show a high pectin content and are formed into a good jelly, it can be said with certainty that pectin has been added, which is not the case with apricots, peaches, red currants, apples and many stone-fruit products.

Pectins are tolerated in most countries, a notable exception to this being America, where no other addition save sugar is permitted in fruit preservation, which in the eyes of the American legislators is probably quite justified. This, on the other hand, is quite wrong from the point of view of dietetics and the national well-being. It is widely recognised to-day, as a matter of fact, that colloids play an important part in nutrition, and that an addition of pectin renders food rich in sugar, like jam and marmalade, infinitely more digestible and wholesome. This statement may be proved at any time by reference to the literature on the subject. Further, the addition of pectin means a great saving of time and a considerable saving of coal, the time of cooking lasting only a few minutes, whilst in this manner the fruit product retains much more of its colour and natural flavour. All these advantages have served to make pectin an important and widely used aid in fruit preservation, and its manufacture has become, therefore, an industry of some significance.

Dried Pectin.

Pectin products are on the market in two forms: (1) as pectin extract or (2) as dried pectin in the form of powder. Pectin extract is at the moment exclusively produced from apples. Personally, I find the former the more attractive, because this pectin is extracted from the fruit in a not too forcible manner, with the simple aid of water. Such pectin solutions are merely filtered and thickened under vacuum. In isolated cases this pectin is afterwards dried. In my experience this drying, however, is merely superfluous, as the pectin has only to be brought back into solution before being used, which is not exactly an easy matter, besides which certain valuable properties of the pectin are lost. It invariably becomes darker, and jellies made from it are no longer as elastic and "short" as those made from the original pectin solution. The taste is also somewhat different. All this comes about through the inevitable overheating during drying, and the fact that oxidation appears to a certain extent damaging to the pectin-molecule in particular.

Most dried pectin, however, comes, not from apples, but from citrus fruits or, in the main part, from the skins of citrus fruits, which are not otherwise used.* Herein is an essential difference from apple pectin, and one that is noticeable in a comparison between a jelly made with citrus powder and those cooked with apple pectin. The apple jelly has a fresher taste and a more delicate and elastic texture. Any expert could ascertain the difference immediately.

Chemical Extraction.

Citrus pectin, however, holds out one great advantage to a good chemist. A skilful pectin chemist will immediately detect the presence of foreign pectin, in apricot jam for instance, if citrus pectin has been added, citrus pectin having the characteristic property of taking on an intense yellow colouring with a solution of caustic soda. First its colour is a sort of canary-yellow, afterwards becoming somewhat reddish. Apparently this pigment (*Farbstoff*) is nearly related to that of oranges and lemons and is due to a bitter-tasting substance known as *Hesperidine* or *Naringine*, which is present in oranges, lemons, and grapefruit, and traces of which are to be found in citrus pectin.

For certain reasons citrus pectin cannot be obtained as an extract. The skins of citrus and orange contain bitter principles, essential oils, and, above all, a considerable amount of pigments, so that the pectin from these sources is only to be obtained by chemical means, the usual method being to extract with water and then precipitate. Numerous methods have been patented, some using salts and others precipitation by electrolysis; there is also the older method of precipitating with alcohol. It will be seen that citrus pectin resembles a chemically obtained substance, more so than does apple pectin, which only required ordinary extraction—that is, in the way that, for instance, an ordinary apple jelly is produced by boiling the fruit.

There is one thing to be said for citrus pectin, that when added to marmalade the latter is less adulterated than when apple pectin has been added. That is, however, the only case. At any rate one should not

* Citrus pectin, therefore, does not come from the eatable and palatable part of the fruit, but from the peel.

press the analogy too far, otherwise for red-currant jam a special red-currant pectin would have to be prepared, for apricot jam a special apricot pectin, and so on. Marmalade can also be made with apple pectin in the same way that apricot jam may have added citrus pectin, but the manufacturer should never forget that citrus pectin in apricot jam can be chemically detected (though not apple pectin—provided, of course, that the amount added is not abnormally high).

Pectin Determination.

The total pectin content of a given fruit product can be fairly accurately ascertained, and this through the combination of two methods. The one consists of dissolving out the pectin with water and then precipitating by the addition of alcohol, the precipitated pectin being then dried and weighed. The second method, devised by the English chemist, Miss Haynes, is based on the principle that an ingredient of pectin—pectic acid—forms, with lime, an insoluble salt. This salt, *calcium pectate*, can be precipitated, dried, and weighed, and thus give a fixed criterion for the amount of pectin contained in the product.

The only country in Europe to standardise officially the use of added pectin is, so far, Germany; 0·3 per cent. may be added to jam and marmalade products—calculated as calcium pectate. Jellies may contain 0·6 per cent.

To ensure this, however, is not so simple, the fruit already having a certain percentage of pectin. This normal content fluctuates very widely even in the one and same kind of fruit—namely, with the degree of ripeness, with the origin of the fruit, and with different weather conditions. Fruit grown in a dry year will differ from that grown in a normally rainy one, quite apart from the fact that there are many kinds of pectins. Some pectins give good jelly yields, others do not jelly at all. In order, therefore, to standardise the pectin amounts to be added to jams it would seem necessary to define what is meant exactly by "pectin," and, furthermore, to define the amount of natural pectin to be presupposed in any given kind of fruit. If one assumed apricots to have a natural content of 1 per cent. and were allowed to use at most 0·3 per cent. of additional pectin, one might have an approximate basis on which to estimate, but it would not be completely satisfactory by a long way.

Two Main Problems.

Considerable time and pains have been devoted to this problem in Germany already, and the principal difficulties seem to centre on the following two points:

1. It is true that a quantitative determination by the ca-pectate method yields a definite figure for the pectin acid content, but does not indicate the construction or properties of the original pectin molecule. In other words, we cannot tell from the ca-pectate figure the pectin quality—*i.e.*, how great a quantity of jelly could be produced with the pectin in question. This is the most important point for the food chemist, however.

2. A second defect of this method of analysis is to be found in the fact that one cannot differentiate between normal and added pectins. So long as we have no method of determining—for instance in apricot jam—how much pectin the particular brand of this fruit contains and how much the jam manufacturer has admixed, any laws regulating pectins and added fruit juices must remain very problematical as to their value.

It is a question whether the great trouble which has been gone to in this connection, and the discussion which the problem has aroused, had not been better employed in other directions.

Let us assume that someone (in Germany) proposes to manufacture strawberry jam. He takes, therefore, say, 60 kg. sugar, 45 kg. strawberry pulp, and from 7 to 8 kg. good pectin extract. That makes altogether 113 kgs., which will have to be boiled down to about 100 kg. Now, it will be recognised that "pulp" is a distinctly vague term. It is delivered in barrels, and to 100 kg. of fruit there is often 40 or 50 litres of liquid, and even more. If the whole contents of the barrel, whether sent through a passing machine or not, is put into the boil, then the food laws have not been broken in all probability, neither has the pectin maximum been exceeded, and still the consumer suffers. The point is: Would the product have been more damaged or less damaged if more or less pectin had been used?

Anomalies.

Now assume the opposite case. A German fruit preserving firm grows its own strawberries, boils its strawberries without sulphurous acid preservative and adds no water to the pulp, rather evaporating some. The pulp used by such a firm will be a good 50 per cent. better (from the point of view of quality much more) than the raw material earlier described. This firm now boils according to the same recipe and produces (according to the legal definition) exactly the same jam as the first-mentioned firm, which goes to show the inadequacy of the present law as affecting the use of pectin.

Another point of interest. Suppose that the second manufacturer, who will certainly want to put a product on the market to please his customers, manufactures a jam that in respect of consistency is somewhat more jelly-like—that is, the jam is not to be "loose," but rather a stiff, elastic product, which is what a certain customer prefers. Naturally, he will have to use more pectin, but the yield will remain absolutely the same. There is now contained in the jam an amount of perhaps 0·4 ca-pectate. I ask whether such a product, which, according to the present laws in Germany, must be specially marked, is of lower quality than that described in the first place, which was manufactured from a poor, liquid, strawberry-pulp.

It will occasion no surprise, therefore, when I say that the new law in Germany is extremely unpopular among food chemists. The most important thing that one has to remember in making a stiff and elastic product is the pectin maximum! And woe betide anyone who overshoots the mark by 0·1 per cent., though is it such a crime if one does, after all? Are one's customers damaged in any way? One should be left a certain amount of latitude that various aspects of public taste might be catered for

and jams produced which have a syrup consistency or jelly consistency as the case may be, especially when it is a case of using additional matters which, in relation to the total yield, are measured in mere tenths per cent.

I know that at this point I shall be met with objections about "stretching," to which I would reply, however: Is "stretching" simply and solely to be prevented by regulating the pectin amount? Have I not given in detail a case where stretching took place to the extent of several *Zig Prozente* ("teen" per cent.) and this *within the letter of the law?*

Fresh Fruit Control.

And so I propose to broach the matter which I regard as being complementary to the whole pectin controversy: How do chemists at the present time propose to control the amount of *fresh fruit* in a given product exactly? This appears to me to be a far more important theme than all the testing for pectin admixtures, and it might not be a bad thing if food chemists concentrated on working out methods for reliable tests of this kind. If a product contains the prescribed amount of good fresh fruit and a corresponding quantity of sugar, then, from the point of view of the public health authorities and public analysts, it need make no difference at all how much pectin the manufacturer has used; the latter will be sparing enough with his pectin in any case, the price of this product not being by any means so cheap that he can afford to be extravagant with it.

I wish to emphasise that the addition of pectin ought not to be condemned in an inquisitorial manner when the quality and quantity of fresh fruit in jams is so inadequately controlled.

A Problem for Food Chemists.

It would be an excellent thing if the English authorities were guided by this point of view and, instead of limiting pectin contents, defined rather a minimum content of fresh fruit in jams. In this case, however, English food chemists will find themselves faced with the not easy task of working out methods whereby this fresh fruit minimum can be determined. There does not exist to my knowledge any such method, but one could probably be worked out, based on the fact that every fruit has its definite acid and sugar content and, above all, its own fibre content.

So that in the case of jam, marmalade, and preserves, determination should not be so troublesome. Jellies, on the other hand, would certainly present more difficulty. At any rate one will watch the new developments and regulations in England with no little expectation and interest.

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(*Continued from p.* 285.)

In the case of bacon and hams, softness of fat is detrimental in itself, because a low melting point means a flabby, greasy appearance, especially in summer, which militates against sales. Secondly, on cooking it is naturally found that the fat easily melts away from the surrounding tissue. This results in the rasher being practically shrivelled up before it is properly cooked.

Accompanying soft fat we have the ease with which the fat becomes rancid and the disagreeableness of the products so formed.

These being volatile will permeate the whole of the meat when warmed, and often fill the atmosphere of the kitchen as well. They conceal any attractive flavour which the meat might otherwise possess, and are sometimes so offensive as to render the material uneatable.

Where pigs are fed on haphazard lines, this type of bacon is only too prevalent. I need hardly point out that the defect is one which cannot be allowed for or corrected, and that it is unjust to blame either the retailer or the curer in these cases. Until pigs are fed on uniform lines in this country, the general public will continue to buy the Danish article, which, being produced by standardised methods, possesses a standardised flavour.

Fresh meat, of course, cannot show the results of rancid changes, but it may nevertheless vary in flavour according to the presence or absence of food oil in the fat. The wastefulness of soft fat in cooking is also shown in fresh meat, and it is easy to distinguish beef which has been fattened off on greenstuff and roots, etc., from that which has received a large proportion of oil cakes.

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Selling Methods

THE meat industry in this country is rapidly coming to realise that the big step to be taken is toward better sales efficiency. Production problems, in the main, have been solved. It now remains for the meat plant to sell its products with efficiency equal to that which produces them.

If the meat-packing industry in particular has not always been able to sell profitably, it is because it has lagged behind other units in the food field in developing better sales methods.

Packers who are giving thought and study to better merchandising methods are finding many things they did not suspect previously.

Small orders, special and frequent deliveries, wrapping and packaging, advertising, salesmen's methods, educating salesmen, customers' meat preferences and buying habits, seasonal influences, retailers' displays and demonstrations—these are some of the subjects that must be taken into consideration in any campaign designed to reduce selling costs.

Correspondence

The Editor would welcome a free use of this page by readers who have matters of food interests to discuss.

Lacquered Cans

From Dr. E. F. Kohman, N.C.A. Research Lab., Washington.

To the Editor,
FOOD MANUFACTURE.

SIR,

I have no wish to enter into a controversy as to where enamel for canned foods is desirable and where it is not. I wish to make the bare statement of fact that in this country enamelled cans are used for all fruits whose colour is bleached by the reaction of the contents upon the can, with the exception of Royal Anne cherries. In Royal Anne cherries the trade demands that the slight pink colour in the cherries disappear, and, therefore, plain cans are used. Enamelled cans are not used for fruits whose colour is not affected by the reaction of the contents on the can—such as is the case with peaches and apricots, or with fruits that have no colour—such as apples, pears, etc. This effect upon the colour of the fruit is the deciding factor as to whether enamelled cans or plain cans are used. *Without a single exception, all fruits give rise to more prompt formation of hydrogen springers and swells and perforations when canned in enamelled cans than they would if canned in cans made of similar tinplate, but not enamelled.*

In view of this fact, I wish to take exception to the following statement made by Mr. A. Ll. Matthison, which appears in FOOD MANUFACTURE for August, 1929. This statement reads as follows:

> "It is a fact that such action is often severer than if the tin had not been lacquered at all, but this is no fault of the lacquer, but due entirely to faulty methods of application of the lacquer or careless treatment of the tinplate after lacquering."

In view of the above stated fact, it is obvious that this is a misstatement, and, as such, should not remain uncorrected.

In this connection, a brief statement in explanation of the difference in the action of fruits in plain and enamelled cans may be enlightening.

There is no convincing evidence that the enamel itself enters into reaction with the contents of the cans, or with the can, or with a combination of the two. *The major factor of the enamel is in changing the total area of metal exposed, and, in particular, the relative area of tin and iron exposed.* There is probably no doubt that this latter effect is the more pronounced, in that it governs the electrochemical reaction following from the electric couple set up between the tin and iron. It may be added that no can is so perfectly tinned that no iron is exposed, and no can is so perfectly enamelled as to prevent both iron and tin being exposed.

I wish also to take exception to the following statement by Mr. Matthison:

> ". . . It is a well-known fact, however, that fruit canners in America are much more troubled with hydrogen-swells than English fruit canners. Much of the foreign fruit and tomatoes is packed in unlacquered cans, and the contents cannot be compared with British packs for colour or flavour.
>
> "Now the vast majority of English fruit canners use a lacquered can, which partly explains the difference. . . ."

If English fruit canners have less trouble from formation of hydrogen springers and swells than American fruit canners, the reason is probably found in the fact that American canned fruits are commonly subjected to higher storage temperatures in America than English canned fruits are in England. Also, English fruit canners do not can fruits on any such scale as is practised in America, and, no doubt, their canned fruits go into consumption more promptly than is true of American canned fruits. The effect of storage temperature on canned fruits is by far the greatest controllable factor in the development of springers and swells.

Under separate cover, I am sending you a bulletin in which the effect of storage temperature is definitely brought out, and no greater service could be rendered to any canner of fruits than to make it possible that his canned fruits at all times are held at the lowest possible practical temperatures. Many canners of fruits do not realise this, and very few distributors of canned fruits realise it. It is for this reason that I am sending the bulletin, in the knowledge that you will be able to do a great deal to distribute such information.

Yours, etc,
E. F. KOHMAN.

To the Editor,
FOOD MANUFACTURE.

Sir,

May I ask the privilege of a small space in the columns of your valuable paper to express congratulations to all concerned with the recent Confectioners' and Bakers' Exhibition, and to thank those friends in the trade who have again done so much to make this exhibition the unqualified success it has been for some years now.

In case exhibitors or their representatives may see this letter may I venture to inform them that I shall be communicating with them as soon as possible regarding space for 1930.

Yours, etc.,
H. S. ROGERS.
(*Manager.*)

Enquiries and Recipes

Some of the enquiries received, and answers sent, by the "Food Manufacture" Trade Intelligence Bureau.

Enquiries

67. "We are anxious to secure a sulphur-free grease-proof paper to enable us to carry out some experiments. Can you put us in touch with manufacturers, please?"

68. "Can you advise me of the names of manufacturers of thin gelatine in rolls as used for covering bonbons and other novelties?"

69. I am writing to make enquiries regarding machinery for manufacture of our Siamese Local Sauces and condiments used in very large quantities for the people of Siam.

One is made from prawns. One part of fresh (small) prawns is mixed with 1 or 2 parts of salt, allowed to pickle, then ground till it becomes a watery homogeneous mass, and dried in the sun, when the fluid is filtered off and sold as Grade 1 prawn sauce, while the residue consisting of paste is sold as "kapi."

A second is made from fish. One part of fresh (small) fish is mixed with 2 or 3 parts of salt and allowed to pickle in the same way for many days, sometimes weeks, then a large volume of water is added and boiled in vats and filtered. The filtrate is sold as Grade 2 "fish sauce," the residue is thrown away as not suitable for article of diet.

This industry is also carried on by individual families along the sea coast. Though the trade is quite large enough; but there is no co-operation, no uniformity of manufacture, and no grading.

The trade in these sauce and kapi (prawn-paste) is already very large, even though it is limited to those districts within easy reach of the sea coast, as transports of such a fluid material in bully containers is far too expensive to allow it to be sold at a purchasable price in areas more remote from the sea coast.

The idea is to evaporate the sauce down to a powder or paste which, while retaining the essential flavours, are of small bulk as on reaching their final destination they would be diluted with water by distributors to the required strength.

Therefore a small plant or simple machinery would be required as follows:

1. A mixer to mix prawns or fishes with salt, thoroughly break the same into paste or fluid and so hasten the pickling process.

2. Boiler and filter apparatus to extract sauce and kapi. Filter capacity from 25 to 30 gallons of sauce per day of 12 hours.

3. Machine to dehydrate these fluid sauce either into dry powder or paste.

Machine must be simple and cheap. Prices quoted separately in sections—*i.e.*, boiler, filter, extract, and evaporated machine, etc.

Formula mixture and any cheap substitute flavours for the sauce are also required.

I should send you samples of our sauce and kapi, but it is difficult to send anything in fluid and I am afraid it would smell horrible when packed for several weeks. I think any manufacturer would understand a machine for making sauce.

One of my best friends, the son of a man in the saw mill, Mr. Kim Chye, wishes to run a small factory making canned fruits and tinned provisions in the Siamese and Chinese style. He wanted to buy a book telling how to *preserve fruits, beans, and meat*. Will you also kindly find me a catalogue of simple small machinery for stamping the tin into cans of all sizes, with the prices and direction.

[From:

Mr. Tan Heng Loong,
2688, Tung Guan Suei,
Suriwengse Road,
Bangkok, Siam.

Readers are asked to address answers to this enquiry through

Mr. R. H. B. Croucher,
32, Kenilworth Avenue,
Wimbledon Park,
London, S.W.19.]

70. "We have seen articles in various papers on the advantages of using soya flour in bread, cakes, and so on. We should be glad to have your opinion as to what advantages we could expect to derive, if any, from the use of this soya flour in our goods. Perhaps one of your readers who has tried it would be good enough to let us know his experience of it."

Answers to Enquiries

63. Four replies to this enquiry are given:

1. *Blackberry and Apple Jam*

A recipe for making good quality blackberry and apple jam is as follows:

18 lbs. apple pulp
30 lbs. blackberry pulp
72 lbs. sugar

Dissolve the sugar (any grade of white sugar) in a pan, and heat to a temperature of 220° F. Add fruit and reboil to 225° F.

Production, 1 cwt. good quality jam.

Cheaper mixture:

55 lbs. apple pulp
10 lbs. blackberry pulp
58 lbs. sugar
60 lbs. glucose

Production, 122 lbs.

Any variations in the quantity of the above products may be made.

It is impracticable to use fresh apple fruit (for jam-making). We are of the opinion that your correspondent should take into his confidence a practical or technical man before launching out on a manufacturing scale.

2. *Blackberry and Apple Jam*

17 lbs. blackberries
10 lbs. cooking apples
27 lbs. sugar

Pick the blackberries carefully.

Pare and core the apples, cut them in quarters, then chop roughly.

Place all the materials in a suitable-sized copper, stir over a slow fire till the sugar has melted, raise the heat and keep stirring till boiling-point is reached.

Skim off all impurities that may arise during the boiling process.

Lower the light and allow contents of copper to simmer till the jam is ready.

Approximately 1 hour is about the time required for making this jam.

Test by placing a little on a plate in the cool to set.

The grade of sugar used is that known as preserving sugar (large crystals).

3. *Blackberry Jam (Whole Fruit)*

40 lbs. blackberries
3 lbs. fruit pectin
56 lbs. granulated sugar

NOTE.—See blackberries are free from stem, put into pan with 10 lbs. sugar, bring to boil and dissolve sugar, then add pectin. This jam should come off about 221° F. to 222° F. Cool before filling into jars.

Blackberry Jam (No. 2)

48 lbs. blackberries (passed through pulping machine)
58 lbs. sugar
14 lbs. water

Put all in pan together and bring off about 221° F. This will fill about 7 doz. 1-lb. jars.

4. *Blackberry and Apple Jam*
Best (Whole Fruit)

25 lbs. blackberries
25 lbs. apples
60 lbs. sugar

NOTE.—Use good firm apples such as Wellingtons, core and chop them and put into pan with blackberries and 20 lbs. water, boil up to about 220° F. and fill off.

Blackberry and Apple Jam (Ordinary)

20 lbs. blackberries passed through pulper
40 lbs. apples (boiled and passed through pulper, not cored)
65 lbs. sugar

This will come off about 220° F. to 221° F., and fill about 102 1-lb. jars.

Seedless blackberry and apple is now made; could give weights for these if desired, or blackberry jelly, etc.

(The cores from best blackberry and apple may be used by boiling with apples for ordinary blackberry and apple after being put through machine.)

Trade News

Food in Glass

THAT THERE should be *no Marking Order for imported glass containers* used in the manufacture of food in this country is the recommendation to the Board of Trade of the Standing Committee under the Merchandise Marks Act, 1926, in their Report following the inquiry in May and June last into the application of the Glass Manufacturers' Federation that bottles, jars, and containers of glass imported from abroad should be marked with the country of origin. The application was opposed at the inquiry by the Food Manufacturers' Federation, Inc., and the Manufacturers' Alliance, Inc.

The Committee, which consisted of Sir H. Llewellyn Smith, Mr. G. N. Barnes, and Mr. F. R. Davenport, state in their Report that the parties agreed as to the similarity of British made and imported bottles and containers, and as to the difficulty in distinguishing between them in the absence of a Marking Order. It was also agreed that the bottlers and food packers knew the origin of the containers they bought. The opponents were strongly opposed to any order principally on the ground that any such mark would be taken to apply to the goods sold in the containers, thereby inflicting serious injury on the trade of the British makers of those goods.

"A number of these manufacturers," states the Report, "including representatives of the Food Manufacturers' Federation and the Manufacturing Confectioners' Alliance, who appeared before us were all confident that the effect of an order would be virtually to prohibit them from purchasing imported containers. Some of these manufacturers purchase the bulk of their glass in this country, but wished to be left free to buy from abroad unmarked glass should they not be reasonably able to fulfil their requirements in this country.

"After very careful consideration of the arguments, evidence, and exhibits submitted to us, we have come to the conclusion that the Order in Council ought not to require the marking of imported bottles, jars, and other containers of glass of the types ordinarily used for the purpose of being filled with beverages, foodstuffs, or any other kinds of goods to be sold or exposed for sale in such containers.

"In arriving at our conclusion we have felt it necessary to attach considerable weight to the evidence of British manufacturers who use bottles, jars, and other containers for the packing of their products. The effect of their evidence was that the result of the compulsory marking of such containers would do serious injury to their trade, both home and export."

* * *

In essential and other oils, business has generally remained on the quiet side during the holiday season, reports the monthly statement of W. J. Bush and Co. in their most recent price list. This, as usual, is a veritable mine of information to the trade.

We hear from time to time suggestions put forward for making the best use of the handsome Kelvin Hall, situated in the West End of the City of Glasgow. The hall is reputed to be the largest of its kind in the country, and was specially built with an enormous floor space, with the view to holding trade exhibitions of various kinds. Early in the spring of next year, it is proposed to hold a Bakers', Grocers', and Confectionery Trades' Exhibition, and this has every prospect of not only being a great success, but it is almost sure to bring out big attendances of the public. It is a pity that the meat trades do not join hands with other food producers, and show the public the great progress they are making in connection with their own trade.

* * *

International Combustion, Ltd., have taken over the staff and assets of the British Rotary Filter Co.

The executive offices of the Filter and Thickener Department, where all inquiries and correspondence should be addressed, will be at 11, Southampton Row, London, W.C.1.

* * *

The Blackburn and District Retail Confectioners' Association has approached the local medical officer of health not only in the matter of the quality of confectionery but also to ask him to fix a standard for "ice-cream" on the lines of the American standards.

The doctor said that as regards fixing a standard for ice-cream, as American States had done, much as he would like to see such regulations over here and assist in promoting them, he was, so far, only an administrator and could only run the laws and regulations already passed by the Government or by the town council. It was for them to secure the necessary regulations through the legislature, after which they could be assured of every possible assistance from him and from his department.

It was suggested that shops that complied with a certain standard for cleanliness and quality might be permitted to exhibit a diploma, or certificate, granted by the Health Department.

* * *

The September *Arkady Review* is another amazingly good number of this compact little review of bread and baking activities. It is the only journal exclusively dealing with the important field covered by the cereal chemist, the baker and the confectioner on the productive side. It is, of course, the organ of the British Arkady Co., of Old Trafford, Manchester.

* * *

According to Press reports from the United States, a young German chemist, Dr. K. F. Bohnhöffer, informed a meeting of the American Chemical Society in Minneapolis recently that hydrogen, which was always supposed to be an indivisible element, was in fact a mixture of two forms of gas clearly differing from each other physically. These two forms, which he called orthohydrogen and parahydrogen, had, he said, different boiling and different freezing points.

Dr. Hugh S. Taylor, of Princeton University, who presided, declared that Dr. Bohnhöffer's discovery was the great chemical achievement of the year. It was as important, he said, as the Royal Society's first expedition to observe whether light passing close to the sun was bent, as Einstein predicted it would be. "It is the first tangible proof," he said, "of the existence in supposedly indivisible molecules of what we may call a different kind of molecule. It opens up the way to finding an entirely different kind of molecule. It is the first proof of something forecast mathematically by the new wave mechanics. It means that our text-books on physical chemistry will have to be rewritten."

* * *

Over six months before the opening of the next British Industries Fair, only five per cent. of the total space in the new and enlarged Olympia, where the London section of the Fair is to be held from February 17 to 28, remains unlet. In some trade sections of the London Fair no room is left at all.

This announcement was made at the Department of Overseas Trade on Tuesday, July 30, at a meeting of the advisory committee of exhibitors in the London section of the Fair over which the new Minister for Overseas Trade, Mr. G. M. Gillett, M.P., presided for the first time.

The arrangement of the various trade groups in the Olympia buildings was agreed upon, and a sub-committee was appointed to consider the question of improving the general appearance of exhibitors' stands.

According to the scheme agreed upon by the advisory committee, the foodstuffs section will be on the ground floor of the main hall at Olympia.

* * *

Group life assurance policies for £100 each have been arranged by the United Glass Bottle Manufacturers, Limited, for their 3,500 works employés. The assurance is issued without medical examination and costs the employé only 3d. weekly, the balance of the cost being met by the company. More than 75 per cent. of all eligible employés signified their desire to join in this benefit.

The total assurance covering this group of workers on the day the scheme became effective was £256,300, and will increase as more join the scheme. The assurance contract has been placed with the Metropolitan Life Insurance Company of New York.

This use of the principles of group life assurance in large manufacturing plants is a striking example of the manner in which the huge purchasing power of the employer may be used in co-operation with employés to provide a vitally important service at a cost which would be prohibitive if attempted individually.

* * *

The fire which occurred at the London factory of the Soya Flour Manufacturing Co. last May, though it destroyed the outer walls, left the plant almost intact, curiously enough. During the work of rebuilding the opportunity has been taken to extend the plant in order to enable the output to cope with largely increased demand.

This plant is, of course, solely used for the production of the Soya flour by the well-known Berczeller process.

REPORTS FROM the Gold Coast Colony indicate that the cocoa crop, early this year, is in full swing. An early close, with very little of the crop remaining in the farms after mid-January, is probable.

The average yield per acre will be slightly below normal.

Liver Sausage.

If liver sausage has a tendency to become sour a pink colour will develop, which is probably due to the fact that the livers are not scalded before they are used, says a writer in the *National Provisioner*.

The livers should be cut in strips, soaked in cold water, then put into boiling water immediately and parboiled, stirring all the while. Then pour this water off and plunge the livers into cold water long enough to cool and bleach.

They are then taken direct to the silent cutter. If a very light coloured product is desired, bleached tripe and edible cracklings may be used with the livers; also hog stomachs, but the latter must be chopped very fine.

"All Quiet——"

The recent outrages by Prohibition agents in the United States, particularly against motorists, have led to a humorous protest, we learn from the *Brewers' Journal*. A correspondent has sent to our breezy contemporary a copy of the following "stick-on" notice, which is being distributed to motorists throughout the country:

——PLEASE——

DO NOT SHOOT US

WE ARE NOT BOOTLEGGERS

A *Faux Pas*

To gratify the British Colony in Paris, and perhaps to cut out the French dairies, an English resident has started a milk business, his motto being "Pure milk at last!" Every day a motor-lorry leaves the model farm (where only tuberculin-tested cows are used) for the Paris depôt, conveying the milk, which is contained in sterilised bottles provided with a sealed cap. A doctor's certificate, a long-winded report signed by an analyst, and a perfect deluge of printed testimonials, from actresses, comedians, and novelists, are on view at the retail establishment—and all proudly framed.

Recently the proprietor of this dairy advertised his activities in a newspaper which specialises in dogs. "Milk by the litre," read the advertisement copy, which unfortunately appeared in cold print as: "Milk by the litter."

Orange Juices.

The popularity of orange beverages has become so extensive that Chicago is now subjecting their sale to the same regulations as govern milk and cream. From a public health standpoint, the officials of the city consider the mineral and vitamin content of orange juice quite as important as the butterfat content of milk and cream. Consequently the regulations require that weekly samples be submitted for bacteriological examination, and these must comply with the bacteriological standard for drinking water on interstate carriers. Employés must be examined for typhoid, either in the active or carrier stage. If orange peel is used in making drinks, the oranges must be treated with chlorine so as to disinfect the exterior. The latest addition to the ruling requires a 10 per cent. content of orange juice.

U.S. Commerce Year-Book.

Volume I. of the U.S. Commerce Year-Book for 1929 has just been released by the Bureau of Foreign and Domestic Commerce. This first volume contains a detailed story of the commerce and industry of the United States and its non-contiguous territories and possessions for the year 1928. It is a history of the economic development of the country during the period under review, with a full discussion of such problems as production, employment, immigration, wages, wholesale and retail indices, foreign and domestic trade, transportation and communication, banking and finance.

Copies are obtainable from the Superintendent of Public Documents, Government Printing Office, Washington, D.C. The price is $1.00 a copy. Volume II., giving information on foreign countries similar to that given on the United States in Volume I., will be released at a later date.

* * *

Tomato cultivation is likely to expand in Cyprus and the demand for processing equipment will probably grow.

Prosperity.

Statistics of International Trade for 1928 show that Canada ranks fifth in total trade, second in exports and total trade *per capita*, third in favourable trade balance, and first in favourable trade balance *per capita*. The increase of 270,000,000 dols. last year in trade was greater than Canada's total trade 30 years ago. Allowing for price changes the physical volume of Canada's trade in 1928, for both imports and exports, was greater than for any previous year, the decrease in the trade last year compared with 1917 and 1920 being entirely due to lower average import and export prices.

Sugar Problems.

The world's sugar production in the last ten years has increased over 11,000,000 long tons. The production in 1919-20 amounted to 15,500,923 tons, whereas the production of 1928-29 was 26,857,601 long tons. This gain has not been spasmodic but persistent during the ten-year period above quoted, only one year showing a decrease in production compared with the preceding year. The result of this phenomenal increase has been that production has exceeded the consumption requirements of the world. As usual, when such conditions exist, prices have declined and the industry faces a critical period.

For some time the world's market has been at a basis of about 2c. per pound of sugar c.i.f. New York. A review of the available statistics for the coming crop shows no great hope of improvement in price in the near future. Producers of sugar are faced with unusual and severe problems of production costs which must be solved in order to bring some measure of stability.

In sun-bleached California. Sweetening the day with carbonated beverages.

Coffee in Chocolate.

According to H. Fincke, writing in the *Zeitschrift für Untersuchung der Lebensmittel*, the addition of coffee to chocolate has no effect upon the properties of the latter or upon the analytical data of the cacao solids. The cacao butter does not appear to change during ripening of the beans, as the fat of less ripe beans has identical properties with that of riper ones. *Theobromine* probably exists, partly free and partly combined with tannin. It may be liberated from this combination by the use either of mild alkalis or dilute acids.

Openings for British Trade

British firms may obtain the names and addresses of the persons or firms referred to in the following notices by applying to the Department of Overseas Trade, personally or by letter (Development and Intelligence), 35, Old Queen Street, London, S.W.1.

Applications for names and addresses must be sent to the Department of Overseas Trade, except where otherwise stated.

Biscuits and Confectionery, and Culinary Essences.—An Indian firm of commission agents established in Karachi are desirous of representing British manufacturers of the above-mentioned lines for North-West India. (Ref. No. 263.)

Edible Oils.—A manufacturers' agent in St. Lucia wishes to secure agencies for these goods in that Colony. (Ref. No. 269.)

Provisions.—A manufacturers' agent in Jamaica wishes to secure agencies for foods and groceries for Jamaica. (Ref. No. 270.)

Provisions (other than Jams, Milk Food, Syrup, and Biscuits).—The Bombay branch of a well-known British firm are desirous of securing further representation for India, Burma, and Ceylon of British firms for the above. (Ref. No. 292.)

Pickled Meats.—A firm of manufacturers' agents in Trinidad wish to secure the representation of a firm interested in pickled meat for Trinidad. (Ref. No. 293.)

Soya Bean Oil and Tea.—A firm in Valparaiso are desirous of securing the representation on a commission basis of British exporters of the above. (Ref. No. 314.)

Canned Fruits; Foodstuffs.—A firm of exporters and importers at Rotterdam desires to secure the sole representation for Holland of British manufacturers of packed or tinned foodstuffs and exporters of South African and Australian canned fruit, crab meat, etc. (Ref. No. 253.)

Foodstuffs.—A travelling representative who has a good knowledge of India is shortly returning to India, and is desirous of obtaining further representation of British manufacturers of foodstuffs. (Ref. No. 238.)

Books Reviewed

A Critical and Historical Study of the Pectic Substances of Plant. M. H. Branfoot (M. H. Carré), D.I.C., D.Sc., Department of Scientific and Industrial Research. Food Investigation Special Report, No. 33. Pp. vii+154. London. H.M. Stationery Office, 1929. Price 3s. 6d. net.

(Reviewed by Dr. W. Clayton.)

The importance of pectin in the studies of food chemists is, of course, recognised, but all who have attempted to read at all widely in the literature thereon, soon admit the confusion entailed by the varying nomenclature adopted by different workers. Dr. Branfoot clears up this confusion, and handles the historical development of the subject in masterly fashion. For this alone the book is invaluable.

We agree with the author that the term *pectin* should be replaced by the wider term *pectic substances*, these being classified as pectose, pectin, pectinic acids, pectic acid, and metapectic acid. Pectose is "the insoluble modification present in association with cellulose in the cell-walls of tissues, which is the precursor of the soluble form." This "soluble form" is pectin, a methoxylated form of pectic acid.

Chapters I. to IV. deal with the properties and constitution of pectose, pectin, pectic acid, and metapectic acid respectively. These chapters are excellent, and the summary of pages 27 and 28 is concise and to be recommended to the student beginning this subject. Chapters V. and VI. discuss the extraction and purification of pectic compounds. The treatment is not detailed, but clearly indicates the main lines of attack. Unfortunately, the book had evidently been printed when the very important paper by Myers and Baker appeared (June, 1929), on the relation of the quality and quantity of pectin extracted and the pH value of the extracting liquid.

The discussion of the quantitative estimation of pectic substances, and the botanical aspects of the location and distribution of the pectic compounds in plant tissues, is, as expected, clear and critical, these being Dr. Branfoot's special fields of inquiry. The action of enzymes, fungi, and bacteria on the pectic substances is next dealt with.

A final chapter, XIII., treats of "The Formation of Pectic-Sugar Fruit Jellies." We believe this chapter is somewhat weak, and much more could be written on the subject. The development of the present conception of the problem is clearly traced, but the work of the Delaware laboratories is only briefly touched upon. It is this work, however, that illuminates the whole field and to which the industrial chemist definitely looks for progress.

The monograph contains ten illustrations and closes with a bibliography of sixteen pages which will prove of marked utility to all students and research workers in this subject. We have no hesitation in cordially recommending the author's study to all food chemists, and to the increasing number of chemists dealing with the pectic substances in other industries.

Illustrierte Nahrungs- und Genuss-Mittelkunde. By Dr. J. Bischoff. Pp. 430. Wittenberg Bez. Halle. A. Ziemsen Verlag.

Deutsches Lebensmittel-Taschenbuch. By Dr. J. Bischoff. Pp. 423. Wittenberg Bez. Halle. A. Ziemsen Verlag.

Die Gewerbliche Herstellung der Obst-, Gemuse-, Fleisch-, und Fisch-Konserven. By Otto Sievers. Pp. 159. Braunschweig. Verlagsgesellschaft Keck and Wesche.

Feinwurst- und Konserven Schule. By Alfred Roberg. Pp. 96. Berlin. Verlag Fleischer-Verbands-Zeitung.

(Reviewed by E. W. Lewis, Ph.D.)

The increasing extent to which food preserving processes are being studied and developed suggests that the appearance of these volumes will be welcomed by those whose work is in this branch of biochemical technology. The German food industry emerged from the war with a heavy technical handicap, for, as was recently pointed out in these columns, it had remained uninfluenced by the advances in the technique of food preserving and canning, which had undergone great changes, principally in the United States.

The rapid developments which have taken place in America in the practical applications of food technology have greatly enhanced the importance and the future prospects of the food industry. The change is one which the majority of industries—based mainly on empirical methods—must undergo, sooner or later, when subjected to the scrutiny of research methods.

The four volumes under review are obviously by writers with first-hand knowledge both of practical food-preserving processes and of recent work in food investigation.

Illustrierte Nahrungs- und Genuss-Mittelkunde is of modest dimensions and is divided into three main sections, of which the first gives an introduction to the scientific aspects of food substances; the second, human foods obtained from animal sources (land and marine); whilst the third section deals with those foods obtained from vegetable sources. The author commences with a concise explanation of the food constituents desirable in human diet under the headings: proteins, fats, carbohydrates, mineral salts, vitamins, and water. The chapter dealing with the accessory food factors contains a well arranged table showing the relative amounts of the various vitamins present in the following: leguminous plants, vegetables and vegetable oils, milk and milk products, meat and meat extracts, eggs, yeast, malt extract, and honey. An important section is that which deals with the methods used (in Germany) for preserving meat and fish, considerable data relating to pickling, curing, drying, freezing, sterilising; the manufacture of sausage, pickles, canned meat and numerous other preparations, and to the drying and preparing of fish for canning purposes. Analytical data are given relating to a large number of meat and fish preparations. The preservation of liquid eggs and the processes applied in the preparing of dried eggs are given in detail. The third section of

the book consists of an admirable account of the more staple articles of human diet, such as bread, cereals, vegetables, butter, margarine, fruits, sugar, coffee, tea, beverages (alcoholic and non-alcoholic), and spices. Valuable information on the preparation of dried fruits, jams, marmalade, fruit salts, fruit jellies, syrups, and conserves is also given.

The author has prepared a comprehensive and well considered volume, which can be recommended as a useful textbook. It contains 272 illustrations.

Deutsches Lebensmittel-Taschenbuch is to the foods and provisions industry what *Chemiker-Kalendar* is to the chemical industry, and is for those who require concise information in a readily accessible form. The author fulfils the aims set out in his short preface, dealing almost exclusively with German conditions.

The book gives the chemical composition and characteristics of preserved meats, fish, milk products, cereals, vegetables, fungi, fruits, wines, etc., and a short synopsis of methods for the evaluations of foodstuffs. Later chapters deal with the money value of foods, food rations for human support, relative digestive values, German food laws and statistics. Other chapters deal with the weights and measures of various countries, and thermometer conversion tables.

The index is somewhat inadequate, and the usual disregard of orthography in German scientific publications with respect to foreign names is not missing in this volume. Except for these minor features, however, the book is a food chemist's vade-mecum.

Otto Sievers' book is concerned with the preparation of preserved fruits, vegetables, meat, and fish, and contains 360 recipes prepared by various authorities in Germany and elsewhere. In the first section of the book there is a short introduction to manufacturing processes. The second part deals with fruit preserving, containers, and the preparation of jams and marmalade, and includes a short account of the technique of English jam manufacture. The third section deals with German methods of preserving vegetables in tins and glass, and details are also given for preserving vegetables in salt and vinegar. The English method of preparing piccalilli is outlined. The last three sections of the volume deal respectively with the preservation of meat, fish, and shellfish. The volume is a summarised account of the preserving of foods on a limited scale.

The author of *Feinwurst- und Konserven Schule*, a well-known specialist in food matters in Germany, writes more particularly on the production of galantine, roulades, minced meats, sausages, meat pies, and pastries. Most of the products dealt with are essentially German and very little known in England. There are eleven excellent illustrations, but from the reviewer's experience of some of these German meat products, the illustrations are far more artistic in design than the real article would be appetising to eat.

Nevertheless, those interested in the manufacturing aspects of galantine and mixed meat products will find this book of service.

Feinwurst- und Konserven Schule is of wide scope, essentially practical and "full of meat" for the manufacturer of these products.

Current Literature

Fruit and Vegetable Products

551. The Viability of Yeast. Irish and Joslyn. (*Fruit Prod. J.*, 8, 12, 11.)

552. Frozen Fruit Problems. Fawcett. (*Ibid.*, 15-17.)

553. Analysis of Tomato Plants. Owen. (*J. Agric. Sci.*, 19, 413-432.)

554. Vitamins in Canned Foods. Kramer, Eddy and Kohman. (*Ind. and Eng. Chem.*, 21, 9, 859-861.)

555. Banana Pectin. Von Loesecke. (*Fruit Prod. J.*, 1928, 6, 17-19.)

556. Preparation of an Active Dried Pitching Yeast. Windisch. (*Woch. Brau.*, 46, 288-291.)

557. Extraction and Utilisation of Pectose. Paul and Grandseigne. (*Bull. Assoc. Chim. Sucr.*, 46, 233-246.)

558. Control of Polarisation Losses in Beet Sugar Manufacture. Dumoulin. (*Ibid.*, 218-225.)

559. Tomato Quality. McGillivroy. (*Canner*, 69, 11, 13-16.)

560. Internat. Soc. Sug. Cane Technol., 4th Communication on Factory Data. Del Valle, van der Horst and Zerban. (*Planter and Sug. Manfr.*, 83, 8, 141-143.)

Cereal Products

561. Report on Standardisation of Experimental Baking Test. Harrel. (*Cereal Chem.*, 6, 4, 249-309.)

562. Testing Cake and Biscuit Flours. Brooke. (*Ibid.*, 312-319.)

563. Loaf Volume as produced by different Flours under prolonged Fermentation. Clark. (*Ibid.*, 338-343.)

564. The Determination of Carotin in Flour. Ferrari and Bailey. (*Ibid.*, 347-371.)

565. Rope Bacteria. (*Milling*, 73, 7, 184.)

566. The Nitrogen Content and Quality of Barley. (*Tagesztg. f. Brau.*, Nos. 114-116.)

567. Yield in Cereals. Doughty, Engledow and Sansom. (*J. Agric Sci.*, 19, 472-490.)

568. Flour Research. Fisher. (*Nat. Baker*, 3, 9, 176-179.)

569. Chemical Factors which determine Flour Quality. Fairbrother. (*Ind. Chem.*, 56, 5, 373-376.)

Dairy Products

570. The Odour of Butter. Van Niel, Kluyver and Derx. (*Biochem. Zeitschr.*, 102, 234-251.)

571. Effect of Heat on Milk. Mattick and Hallett. (*J. Agric. Sci.*, 19, 452-462.)

572. Dispersoid-Chemical Methods for the Examination of Milk. Schneck. (*Milchwirt. Forsch.*, 7, 1-34.)

(*Continued on p.* 309.)

Commercial and Legal News

(The Editor does not accept responsibility for any errors which may occur in the following notices.)

London Gazette Information

Merchandise Marks Act, 1926

IMPORTED MALT PRODUCTS

A reference has been made to the Standing Committee set up under the above-mentioned Act by the Minister of Agriculture and Fisheries, the Secretary of State for the Home Department and the Secretary of State for Scotland, acting jointly, in respect of an application for an Order in Council under the Act to require the marking with an indication of origin of imported malt extract; malt flour; malt extract and cod-liver oil; and malt extract blended with any other product in such a way that malt extract comprises more than 50 per cent. of the whole.

Attention is called to the fact that, under the provisions of the Act, while the Committee in every case referred to them must consider whether the goods should bear the indication of origin at the time of sale or exposure for sale, they may also, at their discretion, consider and report upon the question whether such goods should bear an indication of origin at the time of importation.

The date of the inquiry will be announced later. Any communication with regard to the matter should, however, be addressed, as early as possible, to Mr. H. J. Johns, the Secretary of the Standing Committee, 10, Whitehall Place, London, S.W.1.

Voluntary Liquidations

Voluntary liquidations may, in some instances, refer to companies in course of reconstruction

FAIRRIE AND COMPANY, LIMITED. Resolved, August 2, that the company be wound up voluntarily. Mr. J. Kilpatrick, C.A., of Messrs. Deloitte, Plender, Griffiths and Co., 5, London Wall Buildings, E.C.2, is appointed liquidator.

LONDON CRISP COMPANY, LIMITED. Resolved, August 16, that Mr. W. H. Cork, Acct., 19, Eastcheap, E.C., and Mr. W. T. Flower, 19, St. George's Road, Wimbledon, S.W., be appointed joint liquidators for the purposes of winding up the company, in place of Mr. W. T. Flower, resigned.

ENGLISH HOP GROWERS, LIMITED. Resolved, August 28, that this society be wound up voluntarily, and that Mr. G. J. Bellew, 58, Casewick Road, West Norwood, London, S.W., be appointed liquidator.

Advertisement of Cancelling

On August 23, 1929, the Registrar of Friendly Societies, pursuant to the Industrial and Provident Societies Act, 1893, cancelled the registry of the PURE FOOD PRODUCTS, LIMITED (Reg. No. 10,652, R. Herts.), held at Parkway Chambers, Parkway, Welwyn Garden City, Hertford, on the ground that the society has ceased to exist. The society (subject to the right of appeal given by the said Act) ceases to enjoy the privileges of a registered society, but without prejudice to any liability incurred by the society, which may be enforced against it as if such cancelling had not taken place.

Partnerships Dissolved

B. COTTON AND COMPANY (W. E. Hey, G. W. Hey, L. A. Hey and B. Cotton), Botanical Brewers and Pickle Manufacturers, Mansfield, Nottingham. Mutual dissolution as from July 31. The business will in future be carried on by B. Cotton alone. Debts due to and owing by the late firm will be received and paid by B. Cotton.

JONES AND GREGORY (A. V. Gregory, J. S. Gregory, F. V. Gregory and J. Jones), Mineral Water Manufacturers, 5, Broad Street, Parkgate, near Rotherham. Mutual dissolution as from August 16. Debts by A. V. Gregory, J. S. Gregory and F. V. Gregory, who will continue the business under the same style.

LEWIS, CLARKE AND COMPANY (B. E. Lewis, R. Clarke and R. D. Clarke), The Old Sheepmarket, Worcester, Brewers and Wine and Spirit Merchants. Mutual dissolution as from May 23 last, and the business from that date has been and will in future be carried on by Lewis, Clarkes, Ltd.

Meat

UNLABELLED IMPORTED MEAT AND SAUSAGES CONTAINING BENZOIC ACID

At Newmarket (Cambs.), Jack Hurrell, butcher, was summoned for exposing for sale by retail imported meat which was not labelled as imported or with the place of origin.—Mr. P. A. S. Stringer, Deputy-Clerk to the Cambs. County Council, prosecuted, and Mr. S. J. Miller defended.—Defendant pleaded not guilty.—Mr. Matthew Horgan, Inspector of Food and Drugs, Cambridge, said that on July 23 he saw defendant's van in Cheveley. A man named Hatley, in charge of the van, was serving a customer with meat. Witness pulled up his car, and while getting out saw Hatley pick up something and throw it into the van. Witness saw what appeared to be a label turned upside down on a piece of meat. Hatley had about twenty-eight pieces of meat in the van, and admitted that eight pieces were imported. There was imported meat and English meat on each shelf. Witness asked Hatley why the meat was not labelled, and he could not give an answer, but showed one label in the corner of the van. He could only produce this and the label first mentioned. Hatley said the label in the corner of the van had fallen from a piece of meat on the shelf. There was nothing in the van which would show customers that there was imported meat in the van.—The Chair-

man: There were the two labels?—Witness said that one label was upside down and the other was in the corner of the van. Hatley said that the meat on which one label was lying was English.—By Mr. Miller: The label was mounted on a pin, and would take a lot of jolting off a piece of meat. Hatley admitted to eight pieces of imported meat and had only two labels. Last March he told defendant to keep all imported meat on one shelf and label it. He had also called on defendant at his shop.—Defendant said he had been a butcher eight years. On the date in question he saw the van leave his premises with all imported meat on the middle shelf with one label on it. The label was stuck on the shelf and not on the meat.—By Mr. Stringer: The imported meat was mutton and beef. The label was attached to the shelf by a spike. The Inspector told him that if the imported meat was on one shelf with a label it would be in accordance with regulations.—Sidney Hatley then gave evidence. When he started with the van he had all imported meat on the middle shelf. Both labels were on the bottom shelf when the Inspector saw him. It was a long way from Fordham to Cheveley, and it was a Ford van with the springs weak, and the meat often fell off the shelves. His customers knew he sold imported meat. On the bill heads and calendars, supplied to customers, it was stated that defendant sold imported as well as home killed meat.—The Chairman said the Bench had decided to convict, but would hear the other summonses.—Hurrell was also summoned for exposing sausages for sale which contained preservatives, but were not labelled as containing preservatives in accordance with the Public Health (Preservatives in Food) Regulations.—Defendant pleaded not guilty. Another summons was for selling a pound of sausages which contained benzoic acid as preservative.—Defendant pleaded not guilty, and the two summonses were heard together.—Mr. Horgan said that he bought a pound of sausages from Hurrell's van. He told the assistant he had bought them for analysis. He divided them into three parts, labelled and sealed them, handing one portion to the assistant, sent one portion to the Public Analyst, and produced the third. The Public Analyst certified that the sausages contained benzoic acid to the extent of 115 parts per million. That preservative was not one of those permitted in sausages. There was no label attached or near the sausages to state that they contained preservative, nor was there any label in the van. Hatley asked the driver of the van whether there was any preservative, and the driver said there was a little "sprinkling." Hatley said he did not know whether or not the sausages contained preservative.—By Mr. Miller: Under the regulations sausages could contain sulphur-dioxide to the extent of 450 parts to the million. Benzoic acid was a preservative permitted in mineral waters and other drink or food.—In reply to Mr. Miller, Mr. Horgan said defendant said he did not know that the sausages contained preservatives, another assistant having put it in, as customers had complained of the condition of the sausages.—Mr. Miller said in defence that if the benzoic acid was injurious to health it would say so in the certificate.—Mr. Stringer said he had read the regulations, and the Chairman said it was no part of the Public Analyst's duty to state that the acid found would be injurious to health.—The Chairman said there would be a conviction in each of the cases. The fines would be £10 for the first offence and £2 for each of the other two.

Milk Cheese

2·0 Per Cent. Fat

A grocer was recently summoned at Salford for selling cheese not of the quality demanded, and a dairy company was summoned for issuing a label which falsely described the article.

The certificate of the Public Analyst (Mr. H. H. Bagnall) stated that the cheese contained: Fat, 2·0; protein, 17·5; water, 72·5; mineral matter, 4·5; lactic acid, lactose, etc., 3·5. The following comment was made: "A genuine milk cheese should contain at least 45 per cent. of fat, calculated on a water-free cheese, whereas this sample contains 7·3 per cent. calculated in this way, and is therefore deficient of 83·3 per cent. of the mimimum amount of fat.

On the label of the wrapper were the words: "The Bondon Milk Cheese. Delicious. Made by . . . Dairies."

The Inspector said that the price paid for the cheese was equivalent to 1s. 2d. per lb. In reply to the solicitor for the defence, the witness agreed that there was no standard with regard to cheese under the Food and Drugs Act, but said that there was a custom. A milk cheese should be made from milk, not from separated milk. This cheese had only about a third of the value of ordinary cheese; Cheshire cheese made from whole milk could be bought at 10d. per lb.

For the defence it was stated that the cheese was made from separated milk, with the addition of a little whole milk, and the contents were absolutely pure. The manufacturers had used the words "Milk Cheese," with the idea of avoiding any confusion with what was known as cream cheese. The wording of the label had now been altered.

The Stipendiary said that the company must take the responsibility for the shopkeeper, who would be discharged under the Probation of Offenders Act, and the company would be fined 10s. 6d. with £5 5s. costs.

Factory Acts

Heavy Fines

At Walsall, Messrs. Whitehouse and Cantrill, Bloxwich Road, Leamore, were fined a total of £15 on fifteen summonses for breaches of the Factory Acts.

It was stated by Mr. Philip A. Heath, Inspector of Factories, that during the week ended July 20 three girls were employed by the defendants for long hours, with only short intervals for meals.

Gertrude Raybould, one of the girls concerned, said they were told to hurry back from dinner, and if they didn't they were "told off."

Edward Whitehouse, the manager of the business, said the week in question was particularly difficult, as milk was scarce and there was a big demand for it. They had to obtain extra supplies. These arrived at awkward times, but had to be dealt with as soon as received.

Iron Filings in Tea

DESTRUCTION ORDERED

Mr. Walter Peverett, one of the food inspectors of the Hackney Council, applied to the North London magistrate (Mr. Basil Watson) for an order for the destruction of about 90 lbs. of tea which, he alleged, was unfit for consumption.

The magistrate looked at a sample and was unable to detect anything unusual except that the leaves were broken and small. The inspector then produced a large magnet, passed it through the tea, and drew the magistrate's attention to particles of metal adhering to the magnet. These, he said, were iron filings.

The tea was stated to have been exposed for sale in Dalston.

The order was granted.

Polony

SPLITTING THE ATOM

"Ninety-one parts in a million is a very small quantity," argued Mr. E. E. Eccleston, defending a case of contravention of the Food Preservatives Regulations at Nottingham, in which Frederick Cronbach appeared for selling brawn and polony containing sulphur-dioxide.

Inspector H. Leavers said samples showed 91 parts and 70·69 parts per million of added preservative.

"By an old schoolboy sum," said Mr. Eccleston, "it comes to 0·000769 per cent. Science must be on its way to splitting the atom."

Defendant, said Mr. Eccleston, was nearly 80, and had now been persuaded by his friends to dispose of the business.

"I think it is a matter of senile decay," added the solicitor. "He has appeared before, but you will never be troubled with him again."

The Bench stated that as the defendant had gone out of business they would only fine him 10s.

A Milk Case

THE COST OF WATER

When fining Granville Wesson, a Brinsley farmer, for supplying 7½ gallons of milk which contained 2¾ gallons of added water to the Langley Mill Co-operative Society, Mr. F. Whyatt, Chairman of the Nottingham Bench of magistrates, said: "If people want water the authorities provide it at a very small charge, but when they want milk they pay the price and expect to get it. It is a very bad case indeed, and I can quite understand the authorities pressing for a heavy penalty. However, as it is your first offence, we will deal more leniently with you and impose a fine of £10."

New Companies

F. PRATT (WOLVERHAMPTON), LIMITED. (241803.) 106, Salop Street, Wolverhampton. To take over the bus. of a baker and confectioner cd. on at 64, Worcester St., and Salop St., Wolverhampton, by F. Pratt. Nom. Cap.: £2,000.

FUENTE AND SCARCE, LIMITED. (241844.) 33, Rowlands Road, Worthing. To carry on the bus. of dairymen, dlrs. in farm produce, etc. Nom. Cap.: £5,000.

WIGHAM'S STORES, LIMITED. (241771.) To take over the bus. of wholesale and retail grocers and prov. mchts. cd. on at 10, Tamworth St., Lichfield, and at Tamworth, Staffs., as "Wigham's Stores." Nom. Cap.: £5,000.

CALES STORES, LIMITED. (241823.) 327, Cowbridge Road, Cardiff. To carry on the bus. of importers, exporters, mnfrs., and wholesale and retail grocers, provision dlrs., etc. Nom. Cap.: £300.

SAROTTI AKTIENGESELLSCHAFT. (F. 2829.) 6-8, Eastcheap, E.C.3. Incorporated in Berlin. To acquire and continue the chocolate and cocoa factory cd. on in Berlin as Hoffmann and Tiede. Nom Cap.: 11,000,000 Reichmarks.

QUICK, REEK AND SMITH, LIMITED. (241949.) 148, Fenchurch Street, E.C.3. To carry on the bus. of coffee mchts. formerly cd. on at Fenchurch St., E.C., as "Quick, Reek and Smith." Nom Cap.: £30,000.

A. GRANT (NEWCASTLE), LIMITED. (242005.) 61, Blenheim Street, Newcastle-upon-Tyne. To carry on the bus. of pork pie and sausage mnfrs., etc. Nom. Cap.: £250.

IMPERIAL FLOUR MILLS (1929), LIMITED. (242068.) The Mill, Ellesmere Port, Ches. To take over the bus. cd. on by Imperial Flour Mills, Ltd. Nom. Cap.: £100.

LEWIS A. MAY (PRODUCE DISTRIBUTORS), LIMITED. (242072.) To carry on the bus. of cream, butter, milk, and cheese importers, exporters, and dlrs., etc. Nom. Cap.: £3,000.

PURE FRUIT JUICES, LIMITED. (241637.) 45-47, Ludgate Hill, E.C.4. To carry on bus. as indicated by the title. Nom. Cap.: £100.

WILLIAM HASKELL, LIMITED. (241615.) 27, Queen Victoria Street, E.C.4. To enter into an agmt. for the acquisition of a process for the mnfre. of wines from concentrated grape juice, and to carry on the bus. of mnfrs. of and dlrs. in wines, etc. Nom. Cap.: £5,000.

HOME CO-OPERATIVE SUPPLY, LIMITED. (241603.) 14, Butts Court, Albion Street, Leeds. To carry on the bus. of grocers and mchts., provision mchts., etc. Nom. Cap.: £1,000.

CRAVEN'S BOTTLING STORES, LIMITED. (242127.) Trafford Place, Old Trafford, Manchester. To take over the bus. of an ale and porter bottler cd. on at Old Trafford as "Craven's Bottling Stores." Nom. Cap.: £5,000.

W. H. GEARY, LIMITED. (242080.) 22, Cross Street, Reading, Berks. To carry on the bus. of butchers, etc. Nom. Cap.: £4,000.

MALPAS BROTHERS, LIMITED. (242138.) 121, Handel Street, Liverpool. To take over the bus. of bakers cd. on at Liverpool as "Malpas Bros." Nom. Cap.: £2,000.

SWAN'S STORES, LIMITED. (242141.) To take over the bus. of a grocer, provision, and hardware dlr. cd. on at 76, Abbeydale Rd., Sheffield, as "Swan's Stores." Nom. Cap.: £5,000.

R. H. Bell, Limited. (242182.) 2, Grosvenor Street, Hanley, Stoke-on-Trent. To take over the bus. of a wholesale grocer and drysalter cd. on at Hanley by Emma Bell. Nom. Cap. £6,000.

F. S. White, Limited. (242174.) 1c, Bank Street, Rawtenstall, Rossendale, Lancs. To carry on the bus. of bakers, confectioners, etc. Nom. Cap.: £500.

Fruveg, Limited. (242249.) 14, King Street, Cheapside, E.C.2. To carry on the bus of importers and exporters of and dlrs. in fruit, vegetables, market produce, meat, fish, etc. Nom. Cap.: £2,000.

Clayton (Oswestry), Limited. (242255.) 17, Bailey Street, Oswestry. To carry on the bus. of pork butchers, meat salesmen, etc. Nom. Cap.: £400.

W. Ridley and Sons, Limited. (242211.) 10, Marlborough Crescent, Newcastle-upon-Tyne. To take over the bus. of live stock and wholesale meat salesmen cd. on at Newcastle-on-Tyne by J. H. Ridley and T. Ridley. Nom. Cap.: £1,200.

Associated Confectionery Manufacturers, Limited. (242212.) Stafford House, King William Street, E.C.4. To acquire and amalgamate the undertakings or share capital of any company carrying on the bus. of mnfrs., importers, and exporters of and dlrs. in sweetmeats, confectionery, jams., etc. Nom. Cap.: £100.

Embrey Bakery Machines, Limited. (241523.) The Acorns, Blurton, Stoke-on-Trent. To enter into agrmt. for the acquisition of rights of mnfre. of patented articles, plant or machines of special design used in the working of dough and other bakery constituents, etc. Nom. Cap.: £1,000.

Merton Abbey Creameries (1929), Limited. (241184.) To take over the bus. of margarine mnfrs., etc., cd. on at Woodite Towers Factory, Mitcham Common, by Merton Abbey Creameries, Ltd., and to adopt an agrmt. between the said Co. and Margarine Union, Ltd. Nom. Cap.: £1,000.

Yorkshire Food Products, Limited. (241306.) To carry on the bus. of mnfrs. of and dlrs. in lard and pastry compounds; bakers, confectioners, etc. Nom. Cap.: £500.

Bobs, Limited. (241362.) To carry on the bus. of packers of and dlrs. in dried fruit and vegetables, nuts, confectionery, etc. Nom. Cap.: £6,000.

Burnard's Dairy Equipment, Limited. (241336.) To enter into agmts. for the acquisition of the bus. of Burnards (Established 1899), Ltd., and to carry on the bus. of mnfrs. of and dlrs. in dairy, refrigerating and ice-cream plant, etc. Nom. Cap.: £85,000.

Smee Bros., Limited. (241455.) 156-164, Boleyn Road, Kingsland, N.16. To take over the bus. of wholesale provision and canned goods mchts. and bacon driers cd. on at Boleyn Rd., N., as "Smee Bros." Nom. Cap.: £6,000.

William T. Davies and Company, Limited. (241404.) 16, Mytton Street, Hulme, Manchester. To take over the bus. of mnfg. confectioners cd. on at Hulme as "William T. Davies and Co." Nom. Cap.: £6,000.

Current Literature

(*Continued from p.* 305.)

573. Physical Examination of Milk. Grimmer and Benduski. (*Ibid.*, 76-79.)

574. Action of Calcium Saccharate on Milk and Cream. Pyne. (*J. Agric. Sci.*, 19, 463-476.)

575. Test for Vitamin A in Margarine and Butter. Anderson and Nightingale. (*J. Soc. Chem. Ind.*, 48, 139-140.)

Various

576. Control in Mayonnaise Manufacture. Gray, Maier and Southwick. (*Glass Packer*, 1929, 311-312.)

577. Glass Packed Chicken. Fellers and Griffiths. (*Ibid.*, 315-318.)

578. Recent advances in the Low Temperature Preservation of Foodstuffs. Moran. (*J. Soc. Chem. Ind.*, 48, 34, 245-249T.)

579. A Mechanism of Gelatinisation. Usher. (*Proc. Roy. Soc. A.*, Aug., 143-151.)

580. Sugar Splitting Enzymes. Weidenhagen. (*Zeitschr. Angew. Chem.*, 833-835.)

581. Reducing Meat Plant Washing Costs. (*Nat. Prov.*, 81, 5, 21-22.)

582. Tin-Foil as a Packing for Rindless Cheese. Elten. (*Chem. Ztg.*, 53, 586.)

583. Further Studies of Chemical Nature of Vitamin A. Drummond and Baker. (*Biochem. J.*, 23, 274-291.)

584. Transparent Emulsions of some Essential Oils. Whitmore and Linehan. (*Ind. and Eng. Chem.*, 21, 9, 878-880.)

585. Colloid-Chemical Factors in the Production and Breaking of Oil Emulsions. Lottermoser and Calantar. (*Kolloid-Zeitschr.*, 362-377.)

586. Food Preservation and Transport. (Edit., *J. Soc. Chem. Ind.*, 48, 34, 823.)

587. Practical Candy-Making. Berman. (*Conf. J.*, 656, 63-64.)

Analysis

588. The Determination of Invert Sugar. Saillard. (*Planter and Sug. Manfr.*, 83, 7, 121-122.)

589. Detection of Fruit Wine in Grape Wine. Diemair. (*Chem. Ztg.*, 621-622.)

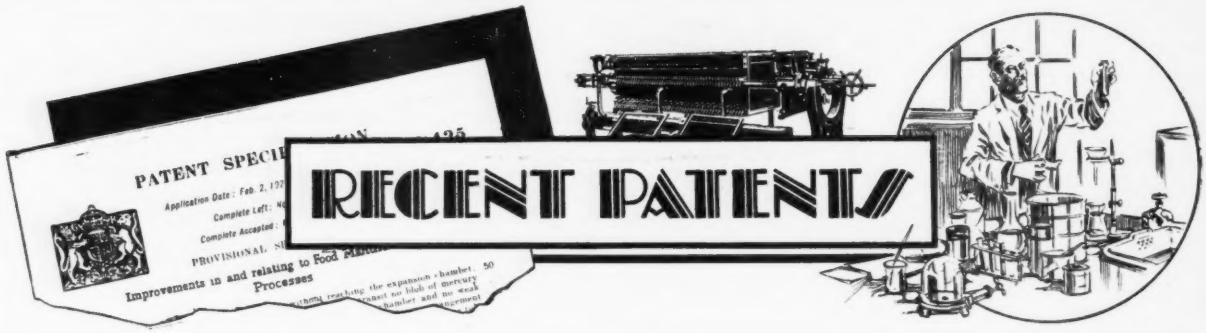
590. Detection of Rancidity in Fats from Intact Seeds and Fruits. Niethammer. (*Z. Unters. Lebensm.*, 57, 358-360.)

591. Petroleum Spirit Test for Purity of Castor Oil. Cocking. (*Pharm. J.*, 123, 11.)

592. Colorimetric Method for Determination of Cystine in Proteins. Folin and Marenzi. (*J. Biol. Chem.*, 83, 103-108.)

593. Detection of Castor Beans in Feeding Stuffs. Wagenaar. (*Z. Unters Lebensm.*, 57, 413-418.)

In an article on Bakery and Confectionery Equipment in the September Food Manufacture it was stated that Messrs. Hansella's continuous vacuum sugar cooker has a daily output of 1½ to 2 cwt. The figures refer, of course, to the daily output in tons.



These particulars of New Patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office.

Latest Patent Applications

26876. MUSAE, P. L.: Food composition. Sept. 4.

27047. ROHM, O.: Manufacture of egg yolk substitute. Sept. 5.

27155. WAKELIN, J. F.: Irradiation of milk, etc. Sept. 6.

25915. CREASEY, B. J.: Labelling Food. Aug. 26.

Specifications Published

318,268. HEILBRON, I. M.: Manufacture of foodstuffs and/or medicines.

318,286. MARINE, G. A.: Means for packing dates and like fruits.

318,641, WINKLER, A., AND DUNNEBIER, M.: Apparatus for automatically setting upright and supplying the work-pieces to chocolate-coating or similar machines.

318,419. PATTULLO, D. L. AND PATTULLO, HIGGS AND COMPANY, LIMITED: Packing, transport, and storage of perishable goods.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at the uniform price of 1s. each.

Abstracts Published

314,401. **Sterilising food.** KREBSER, A., Effretikon, Zurich, Switzerland.

Fruit, fruit juices, meat cheese, and other foodstuffs to be preserved are first sterilised by heating at 60-100° C. and then placed in preserving glasses in a germ-free hot-air chamber, the lids being secured on the glasses by evacuation thereof. While in the chamber the glasses may be supported in a basket, or on foldable stirrups, or on rings, with attachments or supporting boards with holes for receiving the glasses. The lids of the glasses may have mushroom valves to permit of the evacuation.

315,866. **Shaking devices.**. PERKS, T. E., 13, Burwood Crescent, Remuera, Auckland, New Zealand.

Apparatus for imparting vibratory motion to a cream container in the manufacture of butter, or to other articles, comprises resilient means for supporting the article, and means for applying impulses thereto in tune with the natural frequency of the resilient means. A container is mounted at one end of a flat spring the other end of which is clamped to a member vibrated in a vertical direction by a device. The natural period of the spring may be varied by the provision of an adjustable spring. The spring may be clamped at one end and the vibrations applied between its ends. In further forms, the container with or without a weight to decrease the frequency is directly supported by a helical spring, and the vibration is applied by rotating an eccentrically mounted member, or a solenoid with a make-and-brake device may be employed.

Recent Trade Marks

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal," and is published by permission of the Controller of H.M. Stationery Office.

DELMA

498,417. **Cakes, bread, biscuits, and flour confectionery, none of the said goods being made of or containing chocolate or cocoa.** THE DELMA BAKERIES, Delma Bakeries, Oldbury Road, Smethwick, Birmingham. Sept. 11.

CESKAN

503,652. **Confectionery.** W. H. COLLINSON AND COMPANY, LIMITED, 165, Fenchurch Street, London, E.C.3. Sept. 11.

MARIGOLD

502,575. **Peas (for food) and salt (for food).** JOHN CONNOLLY, 46, Prince Street, Bolton. Sept. 11.

CRAG

501,876. **Condensed Milk.** NICHOLAS TAYLOR, trading as N. Taylor, 7, Low Friar Street, Newcastle-on-Tyne. Sept. 4.

THE Methodist Board of Temperance, Prohibition and Public Morals reports experiments to prove that alcohol, even much diluted, is fatal to jellyfish.

What reason, except that the Prohibition Amendment was allowed to pass, is there for believing that we are jellyfish? — *Confectioner's Journal*, Philadelphia.